INDEX NUMBER

Archives of

PHYSICAL MEDICINE

Official Journal American Congress of Physical Medicine

(Formerly Archives of Physical Therapy)

VOLUME XXXIII DECEMBER, 1952 NO. 12

BUILT TO SERVE...the M. D.'s of America!

big enough
to meet the demand,
yet small enough
to specialize

"AG" BOVIE ELECTROSURGICAL
UNIT FOR HOSPITAL USE

L-F

SYMBOL OF DEPENDABILITY AND QUALITY IN
ELECTROSURGICAL APPARATUS
ELECTROMEDICAL APPARATUS
X-RAY SPECIALTIES

THE LIEBEL-FLARSHEIM COMPANY Cincinnati 15, Ohio

When muscles ache or joints are stiff...

Gratifying, prolonged relief from discomfort due to—

lumbago,
muscle pains,
sprains,
painful joints,
stiffness after exercise.

'Menthofax' is an aromatic analgesic ointment containing a high concentration (40%) of methyl salicylate in a base which facilitates application and favors absorption.

'Menthofax'® Rubefacient-Analgesic

Supplied in collapsible tubes of 1 oz.

Burroughs Wellcome & Co. (U.S.A.) Inc., *Tuckahoe 7, New York*

The officers of the American Congress of Physical Medicine and Rehabilitation and the Editorial Board of the ARCHIVES extend to all members, readers, advertisers and friends, their very best wishes for a Merry Christmas and a Happy New Year.

CHANGE OF ADDRESS

Send your new address at least 30 days before the month of the issue with which it is to take effect. Address

THE ARCHIVES OF PHYSICAL MEDICINE
30 North Michigan Avenue, Chicago 2, Ill.

Send old address with the new, enclosing if possible your address label. The Post Office will not forward copies unless you provide extra postage. Duplicate copies cannot be sent.

Members
Standing Committees of the
American Congress of Physical Medicine and Rehabilitation
1953

Advances in Education
Earl C. Elkins, M.D., Chairman.
Harold Dinken, M.D.
Thomas F. Hines, M.D.
Frederic J. Kottke, M.D.
Herman L. Rudolph, M.D.

Awards for Scientific Exhibits
Ben L. Boynton, M.D., Chairman.
Robert C. Darling, M.D.
Donald L. Rose, M.D.
Joseph N. Schaeffer, M.D.
Harry T. Zankel, M.D.

Balneology and Health Resorts
Hans J. Behrend, M.D., Chairman.
William Bierman, M.D.
K. G. Hansson, M.D.
Walter S. McClellan, M.D.
Duane A. Schram, M.D.
Ferdinand F. Schwartz, M.D.
Samuel A. Warshaw, M.D.

Braces, Splints and Prostheses
H. Worley Kendell, M.D., Chairman.
John H. Aldes, M.D.
Robert L. Bennett, M.D.
George G. Deaver, M.D.
Louis B. Newman, M.D.
Odon F. von Werssowetz, M.D.
Jessie Wright, M.D.

Constitution and By-Laws
Walter S. McClellan, M.D., Chairman.
K. G. Hansson, M.D.
Gordon Martin, M.D.

Cooperation with Air Force, Army, Navy, Public Health and Veterans Administration
Alvin B. C. Knudson, M.D., Chairman.
Carrie Chapman, M.D.
Benjamin A. Strickland, Jr., M.D.

Cooperation with Food and Drug Administration
Charles S. Wise, M.D., Chairman.
Ralph E. DeForest, M.D.
Fritz Friedland, M.D.
Joseph L. Hollander, M.D.
Florence I. Mahoney, M.D.
Gordon Martin, M.D.
Sedgwick Mead, M.D.
Fred B. Moor, M.D.
Paul A. Nelson, M.D.

Correlation of Physical Medicine and Psychiatry
Jack Meislin, M.D., Chairman.
Donald A. Covalt, M.D.
Daniel Dancik, M.D.
A. Ray Dawson, M.D.
Everill Fowlks, M.D.
Henry Morelewicz, M.D.

John S. Coulter Memorial Lecture Fund
Walter J. Zeiter, M.D., Chairman.
Ben L. Boynton, M.D.
Walter M. Solomon, M.D.

Ethics
Howard A. Rusk, M.D., Chairman.
Don J. Erickson, M.D.
Keith Keeler, M.D.
Frederic J. Kottke, M.D.
William Northway, M.D.

Finance
H. Worley Kendell, M.D.
Walter M. Solomon, M.D.
Charles S. Wise, M.D.

Foster, Encourage and Coordinate Research Projects
Robert Boyle, M.D., Chairman.
Michael Dacso, M.D.
Karl Harpuder, M.D.
F. A. Hellebrandt, M.D.
William D. Paul, M.D.
Wilbur A. Selle, Ph.D.

Gold Key Awards
William D. Paul, M.D., Chairman.
Alvin B. C. Knudson, M.D.
Gordon Martin, M.D.
Donald L. Rose, M.D.
Howard A. Rusk, M.D.

Legislation
William Bierman, M.D., Chairman.
A. Ray Dawson, M.D.
Harold Dinken, M.D.

Medical Economics
Frances Baker, M.D., Chairman.
Arthur Jones, M.D.
Albert A. Martucci, M.D.

Meeting Place
Walter J. Zeiter, M.D., Chairman.
Miland E. Knapp, M.D.
Paul A. Nelson, M.D.
George M. Piersol, M.D.
James W. Rae, Jr., M.D.

Membership
Max K. Newman, M.D., Chairman.
Thomas P. Anderson, M.D.
Elizabeth Austin, M.D.
Leslie Blau, M.D.
Donald A. Covalt, M.D.
C. DeWitt Dawson, M.D.
S. Malvern Dorinson, M.D.
Fred Fricke, M.D.
Harriet E. Gillette, M.D.
Gustave Gingras, M.D.
Meyer Glick, M.D.
Glenn Gullickson, Jr., M.D.
Dean M. Hayes, M.D.
Thomas F. Hines, M.D.
Morton Hoberman, M.D.
Carl C. Hoffman, M.D.
Frederic House, M.D.
Arthur Jones, M.D.
Herbert Kent, M.D.
Edward M. Krusen, Jr., M.D.
Frank H. Krusen, M.D.
John H. Kuitert, M.D.
Walter J. Lee, M.D.
Florence I. Mahoney, M.D.
Nicholas Mauriello, M.D.
Sedgwick Mead, M.D.
Charles O. Molander, M.D.
Robert Newman, M.D.
Ray Piaskoski, M.D.
Nathan Polmer, M.D.
Jacob Rudd, M.D.
Oscar Selke, Jr., M.D.
Ferdinand Schwartz, M.D.
Euclid Smith, M.D.
Bror S. Troedsson, M.D.
George Twombly, Jr., M.D.
George Wilson, M.D.
Ralph Worden, M.D.

Nominating
Robert L. Bennett, M.D., Chairman.
Earl C. Elkins, M.D.
O. Leonard Huddleston, M.D.
H. Worley Kendell, M.D.
Arthur L. Watkins, M.D.

Prize Lecture
William D. Paul, M.D., Chairman.
Frederic T. Jung, M.D.
Allen Russek, M.D.
Arthur L. Watkins, M.D.

Problems Affecting Physical and Occupational Therapists
William B. Snow, M.D., Chairman.
Herman J. Bearzy, M.D.
Robert L. Bennett, M.D.
Nila Kirkpatrick Covalt, M.D.
Sedgwick Mead, M.D.
Jessie Wright, M.D.

Program
Arthur L. Watkins, M.D., Chairman.
William Schmidt, M.D.
Walter J. Zeiter, M.D.

Public Relations
Frank H. Krusen, M.D., Chairman.
Edward H. Lowman, M.D.
Herman Rudolph, M.D.

Contents—Dec. 1952

Volume XXXIII No. 12

ARCHIVES OF PHYSICAL MEDICINE
(Formerly Archives of Physical Therapy)
30 North Michigan Avenue, Chicago 2, Illinois

Original contributions, exchanges and books for review should be forwarded to the Editorial Office. All business matters including advertising should be handled through the Executive Office, 30 N. Michigan Ave., Chicago 2, Illinois. The statements in the manuscripts published in the ARCHIVES OF PHYSICAL MEDICINE are made solely on the responsibility of the author. The American Congress of Physical Medicine does not assume any responsibility for statements contained therein. Manuscripts accepted for publication in ARCHIVES OF PHYSICAL MEDICINE are for exclusive publication and may not be published elsewhere.

Subscription — In the United States, its possessions, and Mexico, $7.00 yearly; Canada, $8.00; elsewhere, $14.00 the year.

Advertising rates on application. All advertising copy subject to acceptance by publication committee.

Published monthly at Chicago, Illinois, by American Congress of Physical Medicine.

Entered as Second Class Matter, February 15, 1945, at the Post Office at Chicago, Illinois, under the Act of March 3, 1879.

ORIGINAL ARTICLES

•

EDITOR OF THE MONTH

WALTER M. SOLOMON, M.D.

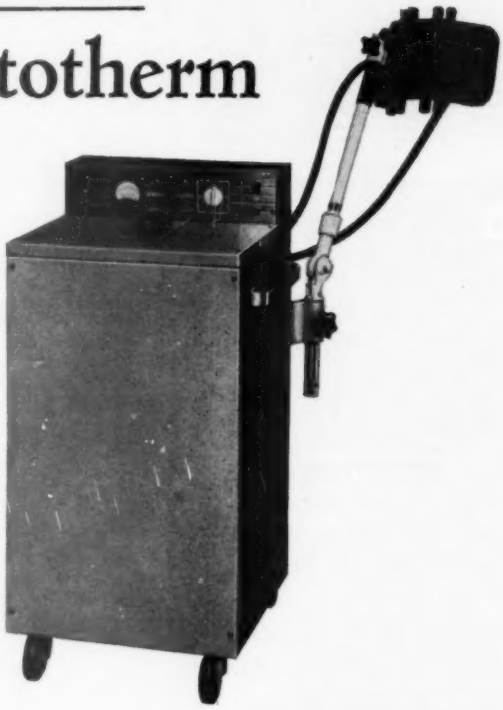
Cleveland, Ohio

Printed in U.S.A.

You'll get a lot more out of the

all-new

GE Inductotherm



Now you can give your patients the desired quality and intensity for the full range of diathermy treatments. New GE Model F Inductotherm combines all the latest advances in induction heating therapy.

As shown in the pictures below, this handsome, trouble-free unit provides for a wide range of diathermy technics. Output has been raised to 200 watts — for most efficient utilization of induction heating methods. Unit is crystal controlled for absolute adherence to FCC-approved frequency.

Demand for the Model F is already great. To insure getting one of these great new Inductotherm units soon, call your GE x-ray representative right away. For illustrated literature, write X-Ray Department, General Electric Company, Milwaukee 1, Wisconsin, Rm. O-12.

GENERAL ELECTRIC

Fully adjustable contour following electrode is part of the basic unit.

Optional is the 12 ft. treatment cable. Note how electrodes attach in rear.

Also available: fully adjustable air-spaced condensor type electrode.

Surgical facilities, integral part of unit, for all medium and light technics.

TWO IMPORTANT STATISTICAL DEVICES *

FREDERIC T. JUNG, M.D.

Council on Physical Medicine and Rehabilitation

American Medical Association

CHICAGO

An attempt to present a mathematical subject to a non-mathematical group is inevitably between two fires: readers familiar with the subject may complain of superficiality while others may complain of obscurantism, affectation, or pedantry. There is, however, a great need for a better appreciation of the help frequently offered by statistics in medical research.

In particular, the two ideas I have been asked to explain in the present paper urgently deserve attention. They happen to be relatively simple, but are also fundamental and practical. Year after year sees new therapeutic procedures introduced in ways that mislead hosts of people as to the benefits obtained and expected. Often the therapy is based on a newly introduced diagnostic procedure that likewise has been introduced in a way that misleads people as to its reliability and significance. One of the less painful consequences is the rejection of inconclusive papers by the editors of medical journals. Another is the nonacceptance of drugs and apparatus for lack of evidence that they are effective and safe. More important is the waste of the research worker's effort, time, and money. The worst, of course, is the fear aroused in patients by mistaken positive diagnoses, the harm done by the delays resulting from mistaken negative diagnoses, and the damage, which need not be further suggested, done by ill-advised treatment.

It would not be difficult to find illustrations of these facts in recent medical history, but an especially good example occurred in the 1790's when a famous and influential physician in Philadelphia introduced a drastic new treatment for yellow fever.[1] Although the sufferers from this disease were generally dehydrated from incessant vomiting and anemic from gastrointestinal hemorrhages, this physician advocated bleeding, emetics, and purgatives, and actually gave them. In spite of the size of his practice, in which he must have treated innumerable patients, he continued to maintain that his treatment was justified both as to theoretical basis and actual results. Incredulous colleagues were silenced, and his one outspoken critic was sued at law, ruined financially, and driven out of Philadelphia. In those days few people thought of statistics, of contratests, and of probability, and mistakes were perhaps more excusable. Today such mistakes can be made only if one ignores what is known about tests for the reliability of diagnostic methods and for the significance of therapeutic results.

This paper is devoted simply to two important statistical ideas or tricks which are very likely to be useful in research in physical medicine. These are: (a) The *TEST-RETEST* (rank-difference) method, useful in appraising results of new *diagnostic* procedures. (b) The *FOURFOLD TABLE*, useful in appraising results of new *therapeutic* procedures.

---

* Read at the meeting of the American Congress of Physical Medicine, Denver, Colorado, September 5, 1951.

1. Editorial: Are Statistics Necessary? J. A. M. A. 143:1260 (Aug. 5) 1950.
Shryock, R. H.: The Development of Modern Medicine: An Interpretation of the Social and Scientific Factors Involved, Philadelphia, University of Pennsylvania Press, 1936.

Test-Retest Procedure

The test-retest procedure is based on the self-evident truth that diagnostic tests should be done in duplicate whenever possible, especially when they are in process of development by their discoverer, but also when they are being adopted in a laboratory where they are new. Some laboratories have been content to see whether a new quantitative method gives the same average reading for a group of subjects as does an older method. This is a very helpless policy, and if the averages differ it does not tell which method is the better. Other laboratories see to what extent *individual* readings by the new method correspond with individual readings by an older method. If the older method is sufficiently direct and reliable to serve as a standard, then such comparison is well justified, and it can lead to the calculation of a quantity called the *index of validity*.

Now there may not be an older method. In that case the test-retest procedure becomes especially valuable. It leads to the calculation of a quantity called the *index of reliability*, and consists essentially of running duplicates as promptly as possible after the first test. The results of the first and second tests are then recorded in parallel columns, as in Table 1.

TABLE 1. — *Raw Data from a Test for Capillary Fragility.*

Subject's Initial	First Score	Second Score
Ra	8	10
J	23	54
S	1	32
W	4	5
B	4	13
D	6	12
Fr	16	8
A	12	12
Fi	11	17
M	11	14
T	8	2
Ro	2	6
	106	185

Table 1, shows the results of a test for capillary fragility. At the time when these data were obtained, the test was being tried out in the hope that it might be useful in a certain vitamin study. Twelve healthy subjects were tested with an apparatus that applied measured suction for measured lengths of time to the volar surface of the forearm. The resulting petechiae were counted. The day's results were scored by an arbitrary method that took into account several applications of the suction, and each subject was retested a week later.

The first thing noticed is that retesting after a week's time gave scores about 75 per cent higher than before, even though the diet had remained the same. This discrepancy alone would have cast some doubt upon the usefulness of such a test, but would not actually have condemned it since many things, such as a change of weather, might have had some genuine effect on the group as a whole. What brought out most clearly the unreliable nature of the test was the calculation of the reliability index as shown in Table 2

The calculation consists in substituting ranks for the original scores. When two subjects tie for a given place they are given the same average rank (e. g., W and B tied for 3rd and 4th place, and both receive 3½). One can now see to what extent there has been an interchanging of places in the

TABLE 2. — *Ranked Data from the Capillary Fragility Test.*

Subject's Initial	Rank in 1st Test	Rank in Retest	Difference = D	D^2
Ra	6½	5	+1.5	2.25
J	12	12	0	0.00
S	1	11	—10	100.00
W	3½	2	+1.5	2.25
B	3½	8	—4.5	20.25
D	5	6½	—1.5	2.25
Fr	11	4	+7	49.00
A	10	6½	+3.5	12.25
Fi	8½	10	—1.5	2.25
M	8½	9	—0.5	0.25
T	6½	1	+5.5	32.25
Ro	2	3	—1	1.00
				224.00

Sum of squares = $\Sigma(D^2) = 224$.

table by forming the column of differences D.

If we square the differences and add, we get the sum of the squares of the differences.

This sum is substituted in a very simple formula ascribed to Spearman:

$$R = 1 - \frac{6\ \Sigma\ (D^2)}{n\ (n^2 - 1)}$$

Where n = number of pairs of measurements.
Here $\Sigma\ (D^2) = 224$, $n = 12$ and $n^2 - 1 = 144 - 1 = 143$.

Then $R = 1 - \frac{6 \times 224}{10 \times 143} = 1 - 0.783 = +0.22$.

This formula is so constituted that the answer R always comes out between —1.00 and +1.00. Negative values for R are exceptional, and can occur only by accident if very poor tests are done on small groups of subjects. In general, +1.00 means perfectly consistent results, +0.90 means a gratifying amount of consistency in a new test, +0.50 means an unacceptably poor test in need of further refinement, and 0.00 means that the results are chaotic. In the present instance, R came out +0.22. A test with so low a reliability index can cause nothing but trouble unless it is capable of improvement, for instance by careful standardization of conditions and the development of elaborate systems of scoring.[2]

When the results of a retest are chaotic, an interesting phenomenon can be observed. The people who did most poorly at the first testing are almost certain to be found near the average on the retest, just as the people who get aces the first time some playing cards are dealt are unlikely to get all the aces on a re-deal. Moreover, anything done in the interval between test and retest may be credited with the supposed improvement of the people who did most poorly on the test. This prenomenon, long recognized as *regression toward the mean* or *centripetal drift*,[3] has been a source of fallacy in much clinical research. That it may have been responsible for confusion in the early work on rutin and hesperidin is suggested by the strange experiences of one investigator, who found that his subjects improved after taking a remedy that had no relation to their assumed deficiencies and that they improved,

2. Bovard, J. F., and F. W. Cozens: Tests and Measurements in Physical Education. Philadelphia, W. B. Saunders Co., 1941.
3. Jung, F. T.: Centripetal Drift: A Fallacy in the Evaluation of Therapeutic Results. Science. 87:461, 1938.

moreover, too promptly for the remedy to have exerted its supposed action.

To understand more of the workings of the test-retest procedure and the rank-difference calculation, we may compare the unreliable clinical test just discussed with a very reliable one, namely, the result of weighing the patient. A patient's body weight is a quantitative, objective and very informative datum; moreover, it is one of the most reliable data available. To appreciate this we start with an imaginary case.

We assume that ten boys were weighed in turn first by one investigator and, a few moments later, by a second investigator in a different room. We assume that the first investigator had a balance reading in the avoirdupois system accurately to the nearest quarter of a pound. We finally assume that the second investigator, who did the retesting, was handicapped by a balance that not only had a zero-error of one pound (i. e., read "one pound" when there was nobody standing on it and it ought to be reading zero) but also could be read only to the nearest pound. When the results are calculated by the rank-difference method, it is seen that R comes out very near +1.00. There have been only trivial effects on the relative standing of the 10 boys, and despite the handicap of a poor balance, the weighings turn out to constitute a far more reliable source of data (have a higher index of reliability) than did the test for capillary fragility.

TABLE 3. — *Example of Good Test-Retest Results.*

(Results of independent weighing of ten boys by two examiners with different balances.)

Boy	First Weight (in Pounds and Quarters)	Second Weight (to Nearest Pound)
EK	85-3	87
FS	86-2	88
GW	91-3	93
D	71-3	73
EF	82-1	83
CG	75-1	76
LH	85-2	86←
C	76-3	78
CC	85-1	86←
WC	88-1	89

Calculation: Subject	Rank — Test	Rank — Retest	Difference = D	Square = D2
EK	7	7	0	.....
FS	8	8	0	.....
GW	10	10	0	.....
GD	1	1	0	.....
EF	4	4	0	.....
CG	2	2	0	.....
LH	6	5½	0.5	0.25
MC	3	3	0	.....
CC	5	5½	0.5	0.25
WC	9	9	0	.....

$$\Sigma (D^2) = 0.50$$

$$R = 1 - \frac{6 \times 0.50}{10 \times 99} = 1 - 0.003 = +0.997.$$

Since +0.997 is so near +1.000, this means that body-weights have a high "index of reliability."

To see how useful a datum a person's weight really is, we now take some actual figures from a study of adolescent boys. Table 4 gives the results of weighing ten boys on a given day and then re-weighing them six months later.

TABLE 4. — *Retesting After Lapse of Six Months.*

Subject	Weight		Rank	
	1935	1936	Test	Retest
EK	85-3	91-0	7	6
FS*	86-2	74-0	8	1*
GW	91-3	98-0	10	10
GD	71-3	77-2	1	2
EF	81-1	83-0	4	4
CG	75-1	79-0	2	3
LH	85-2	91-3	6	7
MC	76-3	83-1	3	5
CC	85-1	92-3	5	8
WC	88-1	96-2	9	9

Because the number of subjects is small, the loss of weight by FS* greatly affects the result, so that R = +0.63. This does not mean that the weights are unreliable, but that body weight is not a fixed characteristic.

In this table one sees the rapid gains made by most of the boys, as is expected in adolescence. One of the boys, however, has lost weight, presumably because of sickness. This not only affected his own rank markedly, but also shifted six of the others. In this instance, the result is that R (remembering the interval of 6 months) fell to +0.63. This low value is to be taken to mean *not* that the weighings were unreliable *but* that body weight is a somewhat variable thing. Curiously, when the boys were reweighed *sixteen* months after the first test, subject FS had recuperated and had become the heaviest of the group. R calculated over this interval of 16 months is found to be +0.86.

TABLE 5. — *Retesting After Lapse of Sixteen Months.*

Subject	Weight		Rank	
	1935 Oct.	1937 Feb.	Test	Retest
EK	85-3	102-2	7	7½
FS*	86-2	133-0	8	10*
GW	91-3	112-0	10	9
GD	71-3	93-0	1	4
EF	81-1	92-1	4	3
CG	75-1	90-2	2	2
LH	85-2	96-2	6	5
MC	76-3	84-2	3	1
CC	85-1	100-3	5	6
WC	88-1	102-2	9	7½

Subject FS* more than regained his rank by a marked growth-spurt. R = +0.86 despite the lapse of 16 months.

Table 5 shows that body weight is a fairly characteristic thing for a given individual despite temporary fluctuations.

An even more reliable measurement is that of height. Even when measurements of height are repeated after six months in fast-growing boys, the boys are likely to come out in about the same order of rank (Table 6). These are actual data from a study of adolescence.

TABLE 6. — *Retesting After Lapse of Six Months.*

Subject	Height*		Rank	
	1935 Oct.	1936 Apr.	Test	Retest
EK	57-4	58-2	5	5
FS	54-4	55-6	2	2
GW	59-5	60-5	8	8
GD	53-0	53-2	1	1
EF	58-5	59-2	6	6
CG	55-2	56-1	3	3
LH	60-2	60-6	10	9
MC	57-2	58-1	4	4
CC	58-6	58-7	7	7
WC	59-7	61-5	9	10

*Height in inches and eighths.
R = +0.99 despite lapse of 6 months.

The calculations are complicated by the unfortunate use of feet and inches, and much labor would have been saved by adhering to the metric system from the beginning. However, the boys were measured again sixteen months after the initial observations, and R was found still to lie very close to +1.00, namely, +0.98.

TABLE 7. — *Retesting After Lapse of Sixteen Months.*

Subject	Height		Rank	
	1935 Oct.	1937 Feb.	Test	Retest
EK	57-4	60-5	5	5½
FS	54-4	58-2	2	2
GW	59-5	62-4	8	8
GD	53-0	57-0	1	1
EF	58-5	60-5	6	5½
CG	55-2	58-4	3	3
LH	60-2	62-2	10	9
MC	57-2	59-6	4	4
CC	58-6	61-5	7	7
WC	59-7	63-4	9	10

Despite the lapse of 16 months, R = +0.98 in adolescent boys.

Evidently the retesting procedure, combined with Spearman's rank-difference method of calculating the results, is useful for many things. It tells how consistent a test is with itself; if there are several possible ways of scoring the test, one can choose the way that gives the highest R; it enables one to distinguish the stable characteristics of the human body from those that fluctuate. It also has other uses that cannot be discussed now. They become evident to one who works with it. For that reason the test-retest procedure is earnestly recommended as an important statistical device.

The Fourfold Table

The other device to be described here is the fourfold table, also called the 2 by 2 table. It is the simplest case of a more general arrangement known to statisticians as the *m* by *n* table. It is surprisingly easy to work with after a few examples have been carried through, and once it has been mastered it gives a quick insight into problems that seem at first quite complex.

The illustration chosen here is from a recent paper in which the author reports some experiences in a summer camp for boys. He wished to see

whether a certain new antihistaminic drug was effective in clearing up the common cold. He wisely instituted controls, and the experiment consisted in comparing the effects of the new drug with a placebo that looked and tasted like the drug. He gives his original data in the following form:

TABLE 8. — *Raw Data from Study of New Antihistaminic Drug.*

Subject	Antihistaminic	Placebo
A	Improved	Cured
B	Worse	Improved
C	No change	Worse
D	Improved	Worse
E	Cured	Improved
F	Improved	Improved
G	Cured	No change
H	Cured	Improved
I	Improved	Cured
J	No change	Worse
K	Improved	Improved
L	Improved	Cured

Each patient was treated for colds occurring at least 10 days apart, once with the antihistaminic drug, once with the placebo.

Upon inspection of this table, and after some cogitation, one gathers from these data that the drug was no better than the placebo, and that is what the investigator rightly concluded.

However, these data can be put into a compact form that enables one to tell much more quickly whether the results were positive or not and enables one, moreover, to compute probabilities in the event of doubt.

TABLE 9. — *Same Therapeutic Data Arranged as Fourfold Table.*

	Unchanged, Improved or Cured	Worse	Totals
New antihistaminic	11	1	12
Placebo	9	3	12
Totals	20	4	24

All the figures in this table refer to number of trials. It says, for instance, that 1 patient who tried the antihistaminic drug felt worse while 3 who tried the placebo said they felt worse. The figures in the four "cells," the subtotals, and the grand total of a fourfold table are always numbers of people, numbers of animals, numbers of trials, in short, they are always what the statistician calls "frequencies," telling how often a thing has happened or how often something has been done. After some experience with fourfold tables one can simply look at these frequencies and tell whether there is much difference between test-subjects and controls, but the statistician is now able to go on to compute a quantity called chi-square by a simple formula.

Computation of Probability That Favorable Results Might Be Due to Chance.

Code: a b R
c d S
U V T

Figures: 11 1 12
9 3 12
20 4 24

$$\text{Chi-square} = \frac{(ad - bc)^2 \times T}{R \times S \times U \times V} = \frac{(11 \times 3 - 1 \times 9)^2 \times 24}{12 \times 12 \times 20 \times 4}$$

$$\frac{(24)^2 \times 24}{24 \times 24 \times 20} = 1.2$$

For the value 1.2, tables of chi-square give p = 0.27 (27 chances in 100) as the probability that the above favorable effect might be accidental. It is therefore not convincing.

In interpreting a fourfold table, it is customary to focus attention upon any one figure actually occupying one of the four "cells" of the table and to compare it with the theoretical figure that would have been most likely to occur there if pure chance had determined the outcome. The theoretical figure is easily determined by multiplying the corresponding two subtotals and dividing by the grand total. Thus, to the actual frequency 3 in the present table corresponds a theoretical frequency obtained from the two subtotals 12 and 4 and the grand total 24 thus: $12 \times 4/24 = 2$. The disparity between the theoretical figure 2 and the actual figure 3 is obviously trivial, and the likelihood that so small a difference between actual and theoretical could have arisen simply by chance is great.

In any but the simplest cases, however, this likelihood has to be determined. This is done by calculating chi-square and then using tables of "chi-square for one degree of freedom" to determine the probability. (A good table is that of Pearl.[4]) If chi-square comes out above 3.8 the statistician concludes that the difference between test-subjects and controls would have happened by accident less than five times in 100. He may be satisfied with this. If one wishes to be more certain, he may ask that the chances be less than 1 in 100; in that case chi-square must exceed 6.6. In the present case chi-square comes out only 1.2, and it is found from tables of chi-square that the difference between test-subjects and controls could have happened by accident 27 times in 100. The statistician would therefore agree with the author that the new drug was no better than the placebo.

Sometimes the same data can be set up as a fourfold table in more ways than one. There is no law against examining your figures from every imaginable viewpoint. The figures just given for the antihistamine study could also be set up thus:

	Improved or Cured	Unchanged or Worse	Totals
New antihistaminic	9	3	12
Placebo	8	4	12
Totals	17	7	24

Another possibility is this:

	Cured	Improved, Unchanged or Worse	Totals
New antihistaminic	3	9	12
Placebo	3	9	12
Totals	6	18	24

This last formulation makes the lack of differences between placebo and antihistaminic in the present experiment especially clear.

4. Pearl, Raymond: Introduction to Medical Biometry and Statistics. Philadelphia, W. B. Saunders Co., 1940, pp. 480-488. Mainland, Donald: Elementary Medical Statistics. Philadelphia, W. B. Saunders Co., 1952, pp. 122 and 318.

Before dropping the subject of the fourfold table it should be noted that if one tries to put the results of an investigation into this form one immediately discovers whether there have been proper "controls." The idea of "controls" is one of the most fundamental in the philosophy of modern biological experimentation, and has immense practical consequences. Thirty if they involve human subjects, the critic's first question was "Where are if they involved human subjects, the critic's first question was "Where are your controls?"

Since that time there has been a regrettable weakening on this point. One sees laboratory manuals in which the directions fail to specify the necessary "controls"; one sees books in which the word is used in ways that not only mislead the student but make one suspect that the author neither understood the idea nor appreciated its importance. There is a semantic reason for this. The word "control" was well established in the English language with other meanings before it was adopted into the scientific vocabulary in its present sense. To most people it still means to govern, to regulate, to rule, or to supervise, and a "controlled experiment" might well be one that is closely watched by some authority. But in definance of the semantic rule that every term should have but one meaning and that one meaning requires but one term, the word "control," when used in biological experimentation, was given its present arbitrary and altogether unexpectable meaning. The manufacturer, tradesman, technician, salesman, even the philosopher and the science reporter may use it without thinking, because it sounds familiar; there is nothing in it to warn the user that it carries a special meaning to the biologist. To add to the confusion, the German vocabulary contains a word "Kontrollversuch" in which "Kontrolle" means "control" in the old, general sense, not the new scientific sense. Fortunately the German also has a very illuminating word "Gegenversuch" which does mean a scientifically controlled experiment. The French language has the equally good word "contre-essai." These German and French words have the immense advantage over the English "control" in that they are almost self-explanatory and certainly are never used in any other sense. The English "contratest" translates them quite exactly and is much better than the word "control." There is every reason why "contratest' should be used henceforward to replace the ambiguous and utterly confusing "control."

About the importance of contratesting medical investigations little more needs to be said at this point. A recent article by Ross[5] showed that 45 out of 100 published medical articles betrayed a lack of the contratests needed to make them convincing. He also gave instances to show how contratests can be set up and how significant they can be in determining the value of the work. A wider appreciation of the fourfold table will help to make sure that the necessary contratests are used in medical research.

Summary

New diagnostic tests should themselves be tested for validity or reliability by recognized statistical methods, such as the test-retest method.

New methods of treatment should be tested and contratested. The contratest group may be untreated, or may receive a placebo, or may preferably receive a previously accepted conventional treatment. The investigation should involve a comparison between test and contratest groups. The probability that observed differences are significant can often be calculated easily after the results are set up as a fourfold table.

5. Ross, Otho B., Jr.: Use of Controls in Medical Research, J. A. M. A. 145:72 (Jan. 13) 1951.

Discussion

E. M. Smith, Col., (MC) U.S.A. (Washington, D. C.): Dr. Jung has warened us about difficulties of talking on mathematics to a non-mathematical audience. His presentation certainly brings to my mind several mistakes in the therapeutic field that could have been avoided if the procedures advocated by Dr. Jung had been followed. For example, around twenty (20) years ago, intravenous mercurochrome was considered to be efficacious yet its therapeutic value was purely empirical.

Mucin only recently had strong advocates for treatment of peptic ulcer. It, too, has become less popular. The next item I can recall I mention for provocative reasons and that is ion transfer. I know of no study being made with measurements of the affect of a drug by iontophoresis that has been associated with control study. Nor have I seen any studies on iontophoresis disclosing the drug assimilated by this therapeutic procedure together with the amount of drug excreted in urine during treatments.

Another example is the problem of basal metabolic rates which has been under question for some time. Today the radioactive iodine has its advocates. I am told it is a very meticulous and sensitive test. Things are accepted, however, in certain eras or times which are later proved erroneous. Not many years ago albumin in urine was diagnostic of Nephritis. Many cases of Pneumonia in those days would manifest albumin in urine, and their death certificate would read "Nephritis" rather than "Lobar Pneumonia." That I consider an error of the times. Dr. Jung has advocated that the term "control" as not being a good scientific term and he believes in the word "Contra-test" and recommends it for adoption.

Thanks are due to Dr. Jung for covering a most difficult subject in simple language and in short time.

RESOLUTION APPROVED

The report of the Council on Medical Education and Hospitals of the American Medical Association was approved by the Advisory Board of Medical Specialties at its business meeting on February 10, 1952. Included in this report was the following Resolution:

"Whereas, An emergency medical call service is of proven value both as a community public service and as a means of good public relations between a physician and his community; and

"Whereas, Participation in such a service is not onerous if many physicians cooperate; and

"Whereas, Every County Medical Society has been asked to operate such an emergency service; therefore be it

"Resolved, That every doctor below the age of 35 years, regardless of his type of practice, be urged to participate in his community's call plans; and be it further

"Resolved, That all national specialty boards be requested by the Secretary of the American Medical Association to facilitate such general participation by assuring their members and potential members that they may participate in such a community activity without jeopardy to specialty ratings.

"Amendment —

"Resolved, That all national specialty boards be requested by the American Medical Association to facilitate such general participation by assuring their members and potential members that they may participate in such a community activity without jeopardy to specialty ratings."

REHABILITATION FOLLOWING RUPTURED INTERVERTEBRAL DISC SURGERY *

JOHN H. ALDES, M.D., F.A.C.S.
FRANCES KOERNER, B.A., R.P.T.†

LOS ANGELES, CALIFORNIA

Much has been published on the pathology, symptomatology, diagnosis, and operative techniques for herniated intervertebral discs but on the subject of pre- and postoperative treatment, little has been written.[1-2-3]

It is our problem as specialists in rehabilitation to outline and supervise not only the preoperative treatment, but also the postoperative regime which rehabilitates the individual back to a normal and useful life.

This paper is concerned with the patients who demonstrate chronic symptoms of herniated intervertebral discs.[4] In evaluating series of cases of both operative and non-operative treatment for those patients, we have found that success in returning the patient to his normal daily activity was due primarily to emphasizing the treatment of the residuals such as spasm, atrophy, and contractures of not only the lower back muscle groups, but also of the entire affected lower extremity.

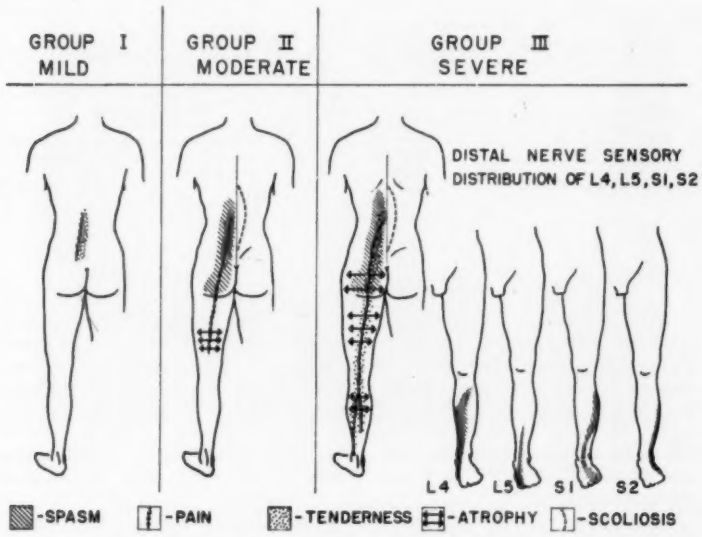


Fig. 1. — Low Back Residual Syndrome Classification.

* Presented at the Twenty-Ninth Annual Scientific and Clinical Session of the American Congress of Physical Medicine, Denver, Colorado, September 7, 1951.
† Department of Rehabilitation and Physical Medicine, Cedars of Lebanon Hospital, Los Angeles, California.

1. Barr, Joseph S.: The Relationship of the Intervertebral Disc to Back Strain and Peripheral Pain (Sciatica), Surgery 4:1 (July) 1938.
2. Barr, Joseph S., and Mixter, William Jason: Posterior Protrusion of the Lumbar Intervertebral Discs, J. Bone & Joint Surg. 23:444 (April) 1941.
3. Greenwood, James, Jr.: The Protruded Intervertebral Disc Diagnosis, Treatment and Results, Arizona Med. 4:33 (May) 1947.
4. Raney, R. Beverly: Conditions Involving the Lower Part of Back, Arch. Surg. 55:87 (July) 1947.

In outlining the program for the rehabilitation of these individuals, we think it is important to classify the residuals into three groups: mild, moderate, and severe. This classification is based upon the duration and severity of the herniated disc (fig. 1).

Classification.

Group	Pathology	Symptoms and Signs
I. Mild	Small protrusion which does not cause nerve root pressure.	1. Transient or intermittent low back pain. 2. Muscle spasm. 3. Mild tenderness on palpation in the involved area.
II. Moderate	Protrusion causing a slight pressure on nerve root.	1. Low back pain. 2. Sciatic pain radiating to gluteal and posterior thigh on involved side. 3. Muscle spasm of lumbar, sacral, and gluteal areas. 4. Atrophy of lower third of thigh. 5. Decreased lumbar curve. 6. Scoliosis opposite to the affected side. 7. Moderate tenderness on palpation on involved side. 8. Mild sensory changes in affected thigh.
III. Severe	Marked pressure on one or more nerve roots.	1. Severe low back pain. 2. Intractable sciatic pain. 3. Muscle spasm of lumbar, sacral and gluteal areas. 4. Atrophy of the affected gluteal, thigh, and leg muscles. 5. Dimmished lumbar curve. 6. Scoliosis away from affected side. 7. Marked tenderness of low back and extremity. 8. Neurological changes including hypesthesia of the leg and foot depending on localization of the lesion. 9. Absence of Achille's reflex. 10. Dorsi flexion weakness.

The individual's distress is due less to the basic etiological factor, which is the protruding disc, than to what we call the "low back residual syndrome." The patient has a pain syndrome which is set up in proportion to the various degrees of pressure upon the nerve root or roots. Unconsciously, he will protect himself from pain, producing a spasm of the erector spinae group which splints his back and thus diminishes the lumbar curve. As the severity of the spasm increases, a lumbar "functional scoliosis" is produced. With spasm and additional pressure upon the peripheral nerves, we find neurological changes occurring.[5-6-7]

Following radiation of pain, whether to the gluteal area, thigh, leg, or foot, the normal reaction of the patient is not to use that extremity. With the disuse of the extremity we get the phenomenon of muscular atrophy of the lower third of the thigh and calf and, as a consequence, generalized weakness with decreased muscle tone of the affected muscle groups.[8]

5. Mothey, Lyle: Neurogenic Pain Simulating Visceral Disease, Am. J. Med. 4:539 (April) 1948.
6. Hoen, Thomas I.; Anderson, Robert K., and Clare, Frank R.: Surgical Clinics of North America, Philadelphia and London, W. B. Saunders Co., 1948, pp. 456-466.
7. Bucy, Paul C.; Heimburger, Robert F., and Oberhill, Harold R.: Compression of the Cervical Spine Cord by Herniated Intervertebral Discs, J. Neurosurg. 5:471 (Sept.) 1948.
8. Bradford, F. Keith, and Spurling, G. Glenn: The Intervertebral Disc, Illinois, Charles C. Thomas, 1945.

With the aforementioned in mind, our postoperative rehabilitation is prescribed to treat the "low back residual syndrome." Failure to begin presurgical muscular therapy may mean the difference between a short or a prolonged convalescence. This is especially true of the moderate or severe groups where diminished muscle tone, atrophy, contractures, and weakness of the back and lower extremity prior to surgery will greatly affect the success of our operative procedures.

In the mild group with intermittent attacks of low back disability due to a mild discogenic disease, a sound, conservative, and noninterrupted program rather than surgery, will increase the percentage of successful cases.

For the relief of muscle tenderness and spasm, short wave diathermy, infra-red, and hot packs are beneficial. Following this a moderate type of massage, including effleurage and light petrissage, will aid in eliminating the waste products of muscle metabolism and increase the blood circulation.

Choice of sedation for diminishing the pain and promoting relaxation is important prior to the therapy. The therapy should be administered twice a day.

In the case of low back immobilization for this group, some form of support such as a lumbo-sacral webbed corset or a two-way stretch "pant bracer" rather than taping is advisable (fig. 2). By using these in acute and sub-acute stages, the injured area is protected from further possible strain, and skin irritation is avoided.

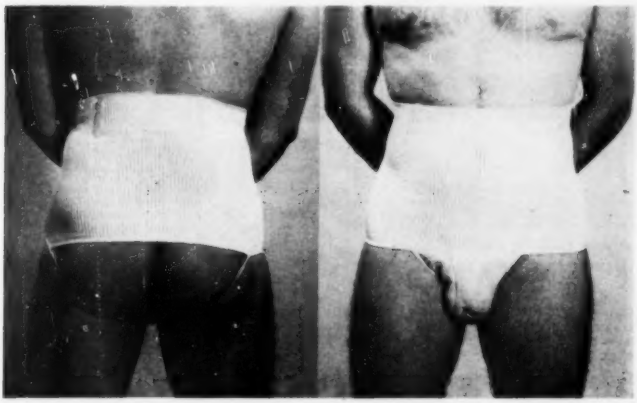


Fig. 2. — Pant Bracer. The bracer is a wide band supporter made of elastic webbing which must fit snuggly to immobilize the pelvis, lumbar and lower dorsal areas, fitting over the inguinal area. This bracer may be worn by a male or a female.

As the condition subsides, the objective treatment is that of increasing the tone and strength of the muscles of the affected areas by therapeutic exercises, but at the same time not restricting the therapy to the affected area alone but including the entire body.

The four objectives are: (1) To correct faulty posture and abnormal body mechanics. (2) To maintain normal curves of the spine. (3) To increase muscle tone of the body. (4) To maintain mobility of the spine.

There are many exercises with the above therapeutic aims in mind. The patient should be taught correct posture and should practice sitting and stand-

ing before a mirror. The "three-way stretch routine" and "knee to chest" exercises should be performed several times daily to strengthen the erector spinae muscles, gluteals, abdominals, hamstrings, quadriceps, dorsi and plantar flexors of the foot (figs. 3, 4).

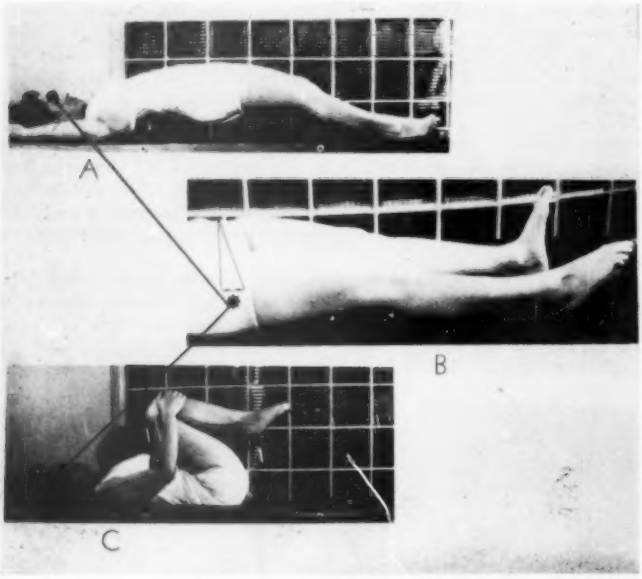


Fig. 3. — Three-Way Stretch. A. Hyperextension of back to strengthen the erector spinae groups, gluteals, hamstrings, and gastrocnemius muscles. B. Leg shortening in which quadratus lumborum, lateral abdominals are strengthened on the same side and stretched on the opposite side. C. Both knees to chest to stretch tight lower back muscles and gluteals.

In the moderate and severe groups we are confronted with an involved lower extremity. In addition to the therapy outlined for the mild group, emphasis should be placed upon the reconditioning of the weakened and atrophied muscles of the leg.[9] It is important that in the presurgical procedure, even though the underlying pathology has not been removed, the muscle tone of the affected regions be maintained. If an individual cannot actively contract or relax the weakened muscles prior to surgery, electrical stimulation will prove to be an aid in muscle reeducation. Progressive resistance exercises at this time for the atrophied thigh and calf are of therapeutic value. It is advantageous to instruct the patient in the static exercises he will do for his back, pelvis, and abdomen immediately following surgery.

The following postoperative regime has been successful in our series: The patient lies supine on a hard bed.[10] Seventy-two hours following surgery, static exercises are given for abdominal, gluteal, quadriceps, and hamstring muscles. The patient actively contracts and relaxes these muscle groups without joint motion while lying supine in bed. Instructions for

9. Martin, John: The Diagnosis and Treatment of Herniation of the Intervertebral Disc, Arizona Med. 4:29 (May) 1947.
10. Falconer, Murray A.; McGeorge, Murray, and Begg, A. Charles. Surgery of Lumbar Intervertebral Disc Protrusion, Brit. J. Surg. 35:223 (Jan.) 1948.

breathing exercises are given not only to avoid chest complications but to improve intercostal and diaphragm muscle tone. With patients who continue to show muscle weakness of the leg, or those in whom there is a weakness as a result of surgery, electrical stimulation is continued. A posterior splint for the leg and foot is important for marked muscle weakness to prevent any deformity. Frequently turning from supine to prone position is not only important to prevent chest and abdominal visceral stasis, but also to restore general body muscle tone.

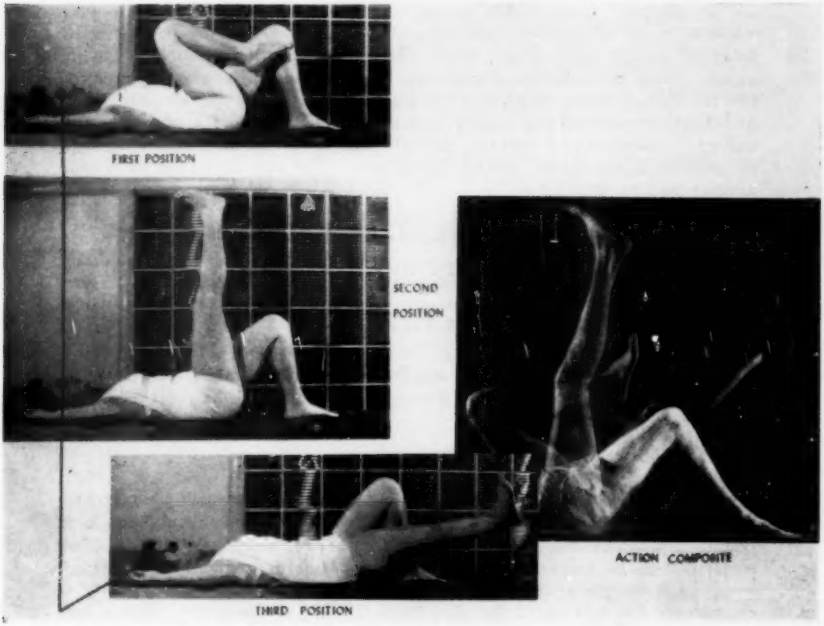


Fig. 4. — Knee to Chest. First position to strengthen abdominals and stretch low back extensors. Second position to stretch hamstrings and strengthen quadriceps. Third position to strengthen abdominals.

At the end of eight days, following removal of the stitches, the program can be increased with the addition of static exercises for the erector spinae. Progressive resistive exercises are beneficial for the atrophied and weakened lower extremity.[11] With a set program of resistive exercises, rapid improvement to normal muscle tone is readily seen.

When the patient begins to sit up in bed, "pant bracers" give added immobilization for weakened back muscles. The patient continues to wear the bracer for at least four weeks during which period ambulation is begun. As the patient's condition improves, the therapy is increased.

Exercises for rotation of the spine may be started at this time. The patient stands before a mirror and places his arm overhead. The upper part of the body is rotated on a vertical plane from the waist, to the left and

11. Delorme, Thomas L.: Restoration of Muscle Power by Heavy-Resistance Exercises, J. Bone & Joint Surg. 27:645 (Oct.) 1945.

then to the right. To increase flexion and extension of the spine, the simple "three-way stretch routine" and knee to chest exercises are recommended as illustrated in figures 3 and 4. The patient should continue to perform these exercises before getting out of bed in the morning and the last thing before retiring, for at least one year.

No matter what type of immobilization has been used during the convalescent stage, it is important that the program of postoperative muscle therapy be emphasized. By doing so, good muscle tone rather than a weakened back will be the result when the immobilization is removed.

In the past, spinal fusion patients remained flat in bed for six months without benefit of exercises, and when ambulatory, were immobilized in some form for another six months. Such a program resulted in a long list of invalids. With the progress of medicine, new techniques in bone surgery, and the knowledge of muscle physiology, we have found that long periods of immobilization without any muscular activity are harmful.[12] Under the new regime of postoperative therapy, patients who have had discs removed, with or without spinal fusion, are not handicapped but able to return to normal activity and to their jobs.

In the majority of cases to be rehabilitated, the type of work the patient has done prior to his discogenic disease must be considered. The entire program should be directed toward that goal, whether the patient be an administrator who sits at his desk, a carpenter, mechanic, or laborer. The final phase in the rehabilitation program must simulate the activities the individual will perform when he returns to his occupation.

We have found that rather than wait until a patient is fully able to return to work, he should be given some activity within his physical capacity, and with continued rehabilitation during this time, finally be returned to his previous employment.

Summary

A program of rehabilitation for the patient with a herniated intervertebral disc following surgery is described. The program is based on the "low back residual syndrome" classification of mild, moderate, and severe groups. The treatment of the residuals such as spasm, contractures, and atrophy of the lower back muscle groups as well as the entire affected lower extremity is discussed. The success of the total rehabilitation of the patient with a herniated intervertebral disc, stressing both the pre- and post-operative therapy, will depend largely upon the emphasis placed on the program of rehabilitation.

Discussion

Dr. Shelby G. Gamble (Cleveland, Ohio): The authors have stressed the fact that residual distress following surgery for a ruptured intervertebral disc is related primarily to changes in the muscular and supporting tissue elements as they affect posture and body mechanics rather than the surgery performed on the disc and the vertebrae. I sincerely believe that in as far as we know this is correct, as we often see the same residual in patients who have undergone surgery by very capable individuals with a diagnosis agreed upon by several competent consultants and yet at the time of surgery no ruptured intervertebral disc is found. The majority of these patients as well as some patients with "discs" show either complete or marked improvement on a conservative program similar to that outlined here so that no other explanation can be accepted as concerns the beneficial factor.

In the classification of cases as well as in the etiology of objective neurological signs we should all remember that the angle and degree of protrusion of the disc is

12. Spurling, R. Glen, and Grantham, Everett G.: Ruptured Intervertebral Disc in the Lower Lumbar Regions, Am. J. Surg. 79:140 (Jan.) 1948.

important. Also, in our post-operative program it is necessary to consider the extent of bony unroofing performed at the time of surgery as well as whether or not intervertebral or extra-vertebral fusion was also performed. Therefore it is necessary to have satisfactory cooperation between the surgeon and the physiatrist as to how early active exercises of any degree can be initiated to the spine and whether or not any portion of the spine needs to be protected by varying degrees of immobilization. Operative notes in most institutions will not answer these questions, since they are too all inclusive and routine, so that personal discussion of the case is advisable.

Certainly a presurgical program is most worthwhile, as the authors have stated. Obviously those patients with marked objective neurological changes seldom benefit as far as correction of the protrusion is concerned. The prime consideration is, of course, the proper preparation of the patient for the post-operative program as early as indicated.

Every operated case must be individualized. The eventual occupational duties are very important in deciding on the type and duration of support. Support alone, without proper physical therapeutic measures to obtain and maintain the objectives as listed by the authors, is probably the most important single etiological factor in prolonged residual low back distress.

The authors are to be commended for their fine presentation of a very common but very important and difficultly manageable condition.

CONTINUOUS OXYGEN-AEROSOL FOR THE TRACHEOTOMIZED RESPIRATOR PATIENT

ROBERT DENTON, 1ST LT., USAF (MC)*

and

JOSEPH N. SCHAEFFER, LT. COL., USAF (MC)†

The purpose of this report is to present a device for continuous administration of an oxygen-rich aerosol mixture to tracheotomized patients in a tank-type respirator.

Invariably the tracheotomy is accomplished to maintain an airway. The tracheotomy by-passes the nares and nasopharynx, which normally provide a large portion of the humidity for the inspired air. In patients with a tracheotomy, the trachea and bronchi must take over the function of humidification.

The physiological drainage of the tracheobronchial tree depends on the tussive squeeze and the expulsive blast during coughing and the ciliated epithelium to move the secretions centrally. Lack of adequate moisture in the inspired air allows the transfer of water in the vapor phase from the mucous membrane to the respiratory gases. This all too quickly leads to dehydration and resultant inspissation of the mucous lining of the bronchial tree. When inspissation is allowed to continue, the increased viscosity of the layer of mucus prevents normal function of the cilia. Obstruction of bronchial lumen occurs in the smallest divisions initially followed by patchy atelectasis. In addition to the mechanical obstruction of the airway afforded by the inspissated mucus the foundation for infection is established.

Air or oxygen, 100 per cent saturated with water vapor at room temperature, would still require some moisture from the tracheobronchial mucosa because of the rise in temperature as the air is pulled into the lungs. Therefore, it is felt that the introduction of an aerosol of proper droplet size is essential to prevent drying of the mucosa and its rapid sequelae. The

* United States Air Force Hospital, Sheppard Air Force Base, Texas.
† Chief of Physical Medicine Service, United States Air Force Hospital, Sheppard Air Force Base, Texas.

aerosol can also be used as a vehicle for the deposition of topical agents upon the respiratory mucous membranes.

Background

Holinger, et al.[1] reported their studies on the physical and chemical properties of respiratory secretions. The secretion of the smaller divisions of the segmental bronchi and bronchioles was observed to be more viscid in the periphery of the tree. These workers described dry oxygen as an "anti-expectorant."

Albers[2] in 1943 reported the use of a nebulizer to produce oxygenated vapor. This device was applied to a pediatric patient in whom tracheotomy had been performed for acute laryngotracheobronchitis. Albers' objective was to prevent the dehydration of the inflammatory secretions which so frequently leads to mechanical obstruction and atelectasis. Essentially the same rationale was expounded by Baker[3] who described a "Tracheotomy Inhaler" designed by Kubicek[4] to deliver a measured amount of moistened air and oxygen mixture directly through the tracheotomy tube. Bower[5] and associates in their report from the poliomyelitis center at Los Angeles County Hospital stressed the importance of adequate humidification of the atmosphere breathed by their tracheotomized patients during respirator care. The rationale of the use of a nebulizer to deliver a supersaturated oxygen-rich atmosphere is based on the mechanical deposition of microscopic particles of liquids on the mucous membranes as Abramson[6] described in his report on aerosol therapy.

The Mist-O_2-Gen nebulizer, as reported by one of us[7] delivers a large volume of oxygen-aerosol at ranges of four to eight liters per minute of oxygen flow. The nebulizer incorporates a self-feeding design which insures continuous operation over a period of eight hours before the reservoir must be refilled. The volume output of aerosol is estimated to exceed that of standard nebulizers by three hundred per cent. The reliable performance of this nebulizer has been observed in several medical centers during the past two years. In addition to a supply of water in microscopic particles, various solutions may be nebulized for specific therapeutic purposes. Thus, topical agents such as antibiotic drugs, shrinking substances, and antispasmodics, may be added to the aerosol to control infection, edema and local spasm.

It was postulated that many of the respiratory complications occurring in tracheotomized respirator patients could be prevented if the oxygen-rich aerosol from a Mist-O_2-Gen nebulizer could be conveyed to the tracheotomy tube. The application of previous techniques[7] using a tent was considered, but it was discarded because of technical difficulties. Therefore, an apparatus to conduct a continuous flow of oxygen-rich aerosol from the Mist-O_2-Gen nebulizer to the tracheotomy opening was developed. This device is constructed of rigid clear plexiglass, so that the flow of aerosol, the character of the respirations, and the patency of the tracheotomy tube can be observed. It consists of an adapting port fitted to the outlet of the nebulizer coned down to a 1¼ inch plexiglass conduction tube. The tube is curved to conform to

1. Holinger, Paul, et al.: The Influence of Expectorants and Gases on Sputum and the Mucous Membranes of the Tracheobronchial Tree, J. A. M. A. **117**:675 (Aug. 30) 1941.
2. Albers, G. D.: Use of a Nebulizer to Produce Oxygenated Vapor, Proc. Staff Meet., Mayo Clin. **18**:511 (Dec. 29) 1943.
3. Baker, A. B.: Bulbar Poliomyelitis, Its Mechanism and Treatment, Am. J. Med. **6**:614 (May) 1949.
4. Kubicek, W. G., et al.: Oxygen Therapy in Poliomyelitis, Arch Phys. Med. **29**:217 (April) 1948.
5. Bower, Albert G.; Bennett, V. Ray; Dillon, John B., and Axelrod, Bernard: Investigation on the Care and Treatment of Poliomyelitis Patients, Ann. West. Med. and Surg. **4**:561 (Oct.-Nov.) 1950.
6. Abramson, H. A.: Principles and Practice of Aerosol Therapy of the Lungs and Bronchi, Ann. Allergy **4**:3, 1946.
7. Denton, Robt., and Smith, Robert M.: Portable Humidifying Unit. II. Large-Capacity Metal Nebulizer, Am. J. Dis. Child. **82**:453 (Oct.) 1951.

the contour of the space between the patient's chin and the respirator collar (fig. 1).

At the apex of the curve on the inferior surface, there is an oval opening. This opening is extended ½ inch by a plastic collar on which a sponge rubber gasket is placed. The sponge rubber ring contacts the neck around the flange of the tracheotomy tube, without touching the tube or flange at any point. The entire weight of the device is carried on the Mist-O_2-Gen nebulizer so that only the desired pressure to insure contact is exerted on the neck of the patient (fig. 1).

Fig. 1. — Apparatus in place on respirator showing Mist-O_2-Gen nebulizer, supporting bracket and transparent conduction tube. Note the visibility of the tracheotomy orifice and the support of the conducting tube on the nebulizer.

The plexiglass conduction system is attached to the Mist-O_2-Gen nebulizer by slipping the cone adapter over two mounting pins on top of the nebulizer (fig. 1). The nebulizer is mounted on an adjustable bracket which fits into a sleeve on the front of the respirator. Thus, the entire device becomes rigidly fixed to the frame of the respirator and cannot be inadvertently dislodged from its position of function. The plexiglass tube is so constructed that with one simple motion it can be immediately removed from the patient's neck (fig. 2) allowing the attendant to instantly expose the tracheotomy tube for suction, cleansing, etc.

The apparatus functions in the following manner: Oxygen-rich aerosol as generated in the Mist-O_2-Gen nebulizer is adjusted to flow through the plexiglass tube at the rate of 4-8 liters per min., depending on the patient's minute-volume. On inspiration, a negative pressure is created at the orifice surrounding the tracheotomy lumen, allowing the oxygen aerosol mixture to flow into the respiratory tree (fig. 3-A).

Because of the constant flow of oxygen aerosol in the conduction tube, the distal segment is continuously filled with the desired mixture. This pro-

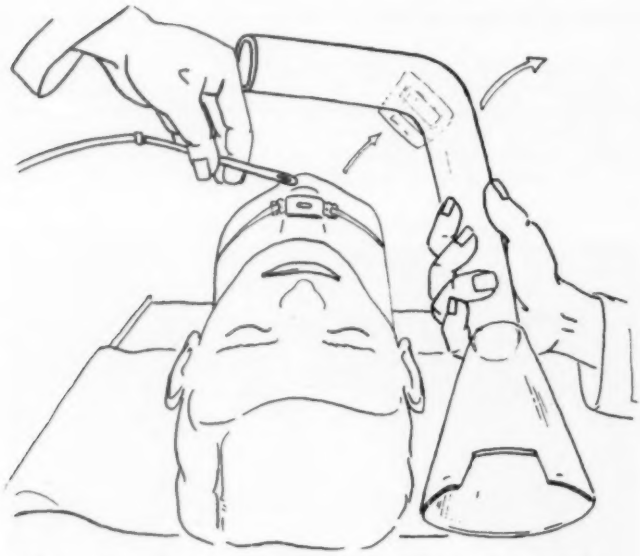
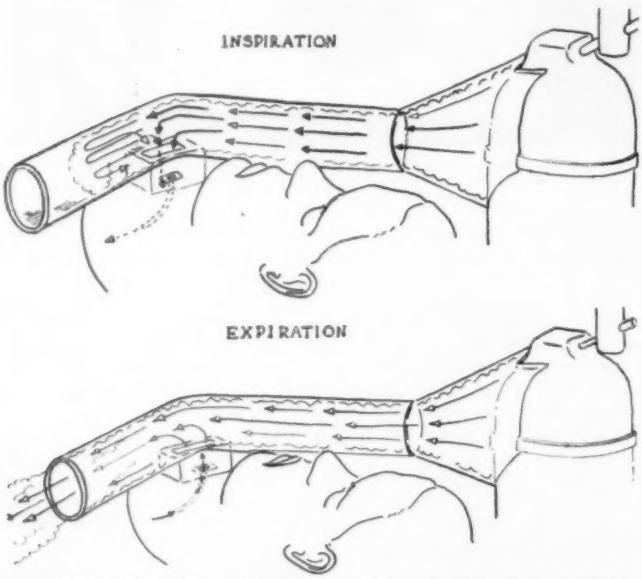


Fig. 2. — One simple motion exposes the orifice of the tracheotomy tube for suctioning.



Figs. 3-A, and 3-B. — Arrows indicate the course of the oxygen-rich aerosol on inspiration and expiration.

vides a safety cushion to prevent back flow of room air to the patient. On exhalation, the flow of oxygen aerosol across the tracheotomy tube assures complete removal of expired gases, and prevents rebreathing (fig. 3-B).

This device and several prototypes have undergone clinical trials with satisfactory results in approximately ten tracheotomized patients. The "toilet" of the tracheo-bronchial tree was maintained in each of these cases and pulmonary complications were either resolved or prevented by the technique described herein. The authors recognize the deficiency of clinical experience at this time but the results obtained in the initial series were sufficiently impressive to warrant this preliminary report.

With the apparatus presented in this report, a supersaturated, oxygen-rich atmosphere can be continuously delivered to the respirator patient's pulmonary tree through the tracheotomy tube. A specific design has been employed to permit visualization and immediate access to the tracheotomy tube. Application of this technique will materially aid in the maintenance of the normal physiology of the respiratory tract.

The Mist-O_2-Gen nebulizer and the design for the tracheotomy adapter reported herein were employed with the permission of the Production Foundry Corporation, Oakland, California.

THE TILTED CRUTCH HANDPIECE

HERBERT W. PARK, M.D.*
ELEANORE W. MALONE, R.P.T.†
and
RUTH STEGLICH, O.T.R.‡

When the normal mechanics of posture and gait are discussed, the principle of weight bearing through good body alignment is always stressed as being an important factor in optimum posture, endurance and comfort. In such considerations, little attention is given to the upper extremities since they are not concerned in the weight bearing process. However, in the crutch walker the axiom is applicable to the upper extremities and is of utmost importance. A review of the literature reveals that rightful significance has been placed on proper crutch length and correct use of crutches; but, so far as can be determined, no consideration has ever been given to the position of the crutch handle.

On considering the functional anatomy of the hand, it is observed that the thenar eminence is much fuller and extends more distally than the hypothenar eminence. As a result, when a free rod is firmly grasped it assumes an angulated position (Figure 1). On examining 35 subjects, this angle was found to range from 5 to 30 degrees with the measurement on 73 per cent of the subjects ranging from 20 to 25 degrees. In 60 per cent examined, the angulation differed between the right and left extremities. In order to correct

* Director of Medical Services, Woodrow Wilson Rehabilitation Center, Fishersville, Virginia.
† Chief, Physical Therapy Section, Woodrow Wilson Rehabilitation Center, Fishersville, Virginia.
‡ Chief, Occupational Therapy Section, Woodrow Wilson Rehabilitation Center, Fishersville, Virginia.

the angle of the rod to a position perpendicular to the fore arm, radial deviation was required. Similarly, it was observed that when a subject bore maximum weight on a conventional crutch handle, the wrist assumed a position of radial deviation (Figure 2).

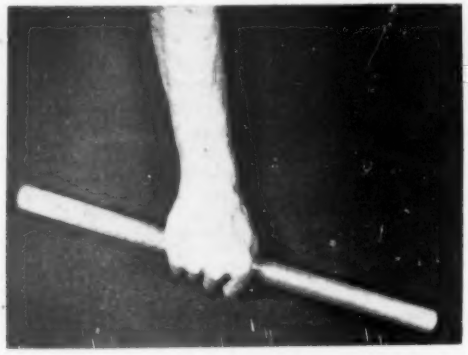


Figure 1. — Relation of a free bar to the forearm when the wrist is in good weight bearing alignment.

Figure 2. — Demonstration of alignment of hand, wrist, and forearm with the conventional horizontal crutch handpiece.

On the basis of these observations and data, the crutch handpiece was altered to meet the individual's needs (Figure 3). As is observed in Figure 4, there is good weight bearing alignment through the wrist. All patients who have a tilted crutch handpiece state that the crutches are more comfort-

able to use than with the conventional handle. It is the clinical impression that by improving the weight bearing alignment through the wrist, fatigue

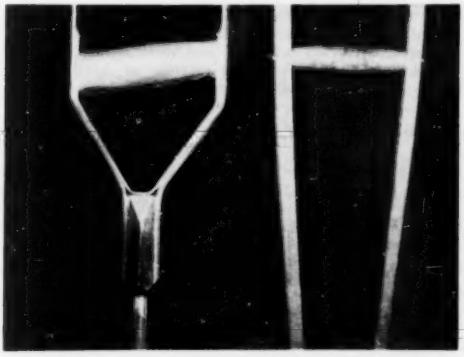


Figure 3. —Comparison of conventional and tilted crutch handpiece

Figure 4. — Demonstration of alignment of hand, wrist, and forearm with a corrected crutch handpiece.

will be lessened, blisters fewer, crutch palsies rarer, and the crutches more readily used.

MEDICAL NEWS

Members are invited to send to this office items of news of general interest, for example, those relating to society activities, new hospitals, education, etc. Programs should be received at least three weeks before the date of meeting.

Congress Participants at A.M.A. Clinical Session

The following scientific exhibits were presented by Congress members at the clinical session in Denver:

Howard A. Rusk, M.D., and Michael Dacso, M.D., New York, N. Y., "Rehabilitation of the Aged"; Harold Dinken, M.D., Denver, Colorado, "Physical Medicine in the Treatment and Rehabilitation of Rheumatic Diseases" and "Physical Medicine and Rehabilitation in Traumatic Conditions"; A. W. Schenker, New York, N. Y., "Residual Poliomyelitis: A, Technique for Rapid Restoration of Function"; John H. Kuitert, Lt. Col. (MC), U. S. A., Washington, D. C., "Creative Expressions of a Reintegrating Personality"; Joseph N. Schaeffer, Lt. Col. (MC), U. S. A. F., "Continuous Oxygen-Rich Aerosol for the Tracheotomized Respirator Patient", Grace M. Roth, M.D., Rochester, Minn., "Pheochromocytoma, A Cause of Hypertension-Diagnosis and Surgical Treatment" and Ralph E. DeForest, M.D.; Frederic T. Jung, M.D., and Howard A. Carter, M.E., Chicago, "Special Exhibit on Artificial Respiration."

Rehabilitation Award

Dr. Henry H. Kessler of Newark, N. J., was recently presented with a physician's award by the President's Committee on Employment of the Physically Handicapped. Each year, a physician will be awarded for making the greatest contribution to the welfare and employment of the physically handicapped.

Graduation Exercises Held at Northwestern University

Graduation exercises for the thirty-first class in physical therapy at Northwestern University Medical School were held on October 3, 1952.

In the absence of Dr. Stafford L. Osborne,* Professor Emeritus of Physical Medicine and Acting Chairman of the Department, Dr. Charles Molander, Assistant Professor of Physical Medicine, presided and presented certificates in physical therapy to fifteen graduates.

The Physical Therapy Alumni Association of Northwestern University Medical School honored both the graduates and Miss Gertrude Beard, retiring technical director, at a dinner following the graduation exercises.

* Deceased.

Drug Distribution Permitted

The Food and Drug Administration of the Federal Security Agency has announced its decision to permit the continued distribution of the antibiotic drug Chloromycetin under revised labeling that will caution physicians explicitly against its indiscriminate use.

Reports of blood disorders attributed to Chloromycetin led to a nation-wide survey by the FDA of the case records in hospitals and clinics. The case histories turned up by this survey were referred to the National Research Council for its aid in evaluating the information. FDA's decision was based on the findings and recommendations of a special committee of the Council's Division of Medical Sciences.

It is estimated that since the drug came on the market in 1949, it has been administered to something like eight million patients.

The labeling of Chloromycetin will be changed to include the following warning:

"Certain blood dyscrasias (aplastic anemia, thrombocytopenic purpura, granulocytopenia and pancytopenia) have been associated with the administration of Chloromycetin. It is essential that adequate blood studies be made when prolonged or intermittent administration of this drug is required. Chloromycetin should not be used indiscriminately or for minor infections."

"WARNING: Blood dyscrasias may be associated with intermittent or prolonged use. It is essential that adequate blood studies be made."

Pennsylvania Academy Meets

At the October meeting of the Pennsylvania Academy of Physical Medicine and Rehabilitation, the following subject was presented: "Spa Treatment in the Commonwealth of Pennsylvania." Color slides were used to illustrate the material.

Liebel-Flarsheim Opens New Plant

Dual Open-House programs marked the opening of the new Liebel-Flarsheim plant at 111 East Amity Road, Cincinnati, Ohio. More than a thousand visitors heard the opening ceremonies on October 4th and saw the working side of one of the nation's largest electromedical manufacturing plants. On October 18th, a second and equally important Open-House was attended by medical, professional, and business friends.

(*Continued on Page 736*)

ARCHIVES of PHYSICAL MEDICINE
OFFICIAL PUBLICATION AMERICAN CONGRESS OF PHYSICAL MEDICINE

.·. EDITORIAL .·.

THE SOCIAL AND PSYCHOLOGIC ASPECTS OF PHYSICAL MEDICINE AND REHABILITATION

In a current article on medical education, Lester Evans,[1] executive associate of the Commonwealth Fund, in discussing "The Next Twenty Years in Medicine," concluded that teaching and research centers must learn to coordinate their activities "if modern medicine is to deal with man as a whole." If we consider not only the physical aspects of disease but also the social and psychologic aspects, we can develop a type of medical practice which, according to Evans, will have "its roots in the lives and needs of the people."

In a new book by Max Pinner and Benjamin Miller[2] entitled *When Doctors Are Patients*, a group of physicians have described their own personal experiences with various serious diseases. It is a revelation to discover that almost every one of these physicians, as he recited the problems which he faced in dealing with his own serious illness, stressed, almost invariably, the psychologic and social aspects of his disease. This led the late Dr. Max Pinner, one of the editors of this volume, to conclude in his preface that "This collection of case reports can only emphasize again and, I believe, in a peculiarly urgent and moving way, how essential it is to treat the whole patient." Pinner added, "The first need is not, in my opinion, diagnosis and specific treatment of so-called psycho-somatic diseases, but the recognition — which is not new, but so frequently forgotten and ignored — that every disease is psycho-somatic, that is, that it affects both body and soul."

In the current report of the president of the Rockefeller Foundation, Chester I. Barnard[3] in discussing medical care commented, "The old idea that biophysics and biochemistry would eventually unravel all the problems of health and disease is less tenable today than was the case forty or fifty years ago. There is a growing realization that inter-related social factors outside of the physics and chemistry of the body are also involved." Barnard concluded, "When research has accumulated and systematized the data into a scientific discipline, bio-social medicine may become an indispensable part of the school curriculum. We may expect medical schools then to introduce students to the practice of community medicine with an emphasis on 'social diagnosis' comparable to that on physical diagnosis."

Physicians who specialize in physical medicine and rehabilitation have given more consideration than any other group of specialists to the philosophy of considering each patient "as a whole" and to the importance of considering not only the physical but also the psychologic and social aspects of every case. Physiatrists have already made an auspicious beginning in fostering

1. Evans, L. J.: The Next Twenty Years in Medicine, J. Med. Education 27:326 (Sept.) 1952.
2. Pinner, M., and Miller, B. F.: When Doctors Are Patients. New York, W. W. Norton & Company, 1952, pp. 364.
3. Barnard, C. I.: The Rockefeller Foundation. A Review for 1950 and 1951. New York, Rockefeller Foundation, 1952, pp. 125.

and expanding this trend which is of great importance to the future of the specialty.

If physiatrists will continue their efforts to accumulate and systematize the data on biosocial medicine, the specialty of physical medicine and rehabilitation may well become the "scientific discipline" mentioned by Barnard. The three references which have been mentioned emphasize the tremendous importance of this phase of our work. An enormous expansion in the range of our services to the sick and disabled will inevitably result, provided that we physiatrists continue to enlarge our interests and to deal with man as a whole by considering not only the physical but also the social and psychologic aspects of each disease or disability which is encountered.

FRANK H. KRUSEN, M.D.

Medical News

(Continued from Page 734)

Grants

The National Foundation for Infantile Paralysis, as a result of the 1952 March of Dimes, has awarded the following grants: $24,500 to Harvard University School of Public Health to continue studies on breathing difficulties of polio patients and to develop and evaluate new methods for improving the care of such conditions; $24,650 to Duke University at Durham, N. C., for making medical movies; $2,150 to Duke Hospital to provide more physical therapy service for Lincoln Hospital.

Statewide Rehabilitation Conference

The first Statewide Rehabilitation Conference was held in Indianapolis, Indiana, on December 4-5, 1952. The conference, a forerunner of a series, plans to: bring together therapists, specialists and professional people from various fields; interpret Indiana's rehabilitation services; review what services are available and from what agencies they may be obtained; stress the importance of inter-agency cooperation and the advantages of dovetailing the various rehabilitation programs.

Personals

Jerome W. Gersten, M.D., Denver, Colorado, has been promoted to associate professor of physical medicine and rehabilitation. **George C. Twombly,** Jr., M.D., has been promoted to assistant professor of physical medicine and rehabilitation. Both Doctors Gersten and Twombly are on the faculty of The University of Colorado School of Medicine at Denver.

Emil J. C. Hildenbrand, M.D., Washington, D. C., has been elected Secretary of the Washington Medical and Surgical Society.

Howard F. Polley, M.D., Rochester, Minn., presented the topic "ACTH and Cortisone in Arthritis" at The Sixth Councilor District Postgraduate Day held in Youngstown, Ohio, in October.

Dr. **Walter J. Treanor** was married in New York on September 27 to Miss Patricia F. O'Sullivan.

Dr. **Odon F. von Werssowetz** of Nashville, Tennessee, was a guest speaker at The Omaha Mid-West Clinical Society meeting in October.

Dr. **John W. Deyton** of Okmulgee, Oklahoma, participated in the annual conference held by The National Rehabilitation Association at Louisville, Ky., October 19-23.

Dr. **Howard A. Rusk,** New York, N. Y., is a member of the Health Resources Advisory Committee. The committee is concerned with the health resources of the nation as they relate to national defense.

Herbert Kent, M.D., Indianapolis, Indiana, was chairman of a panel discussing the topic "Medical and Non-Medical Aspects of Rehabilitation," held at the Veterans Administration Hospital at Indianapolis on December 5.

Newly Registered Therapists

October 6, 1952

Doke, Louis C., Jr., 1018 W. 84th Pl., Los Angeles, Calif.

October 16, 1952

Domenech Munoz, Heriberto, Aquadilla Ave., Isabela, Puerto Rico.

Gross, Martha Ann, 711 Monroe St., St. Charles, Mo.

McDougall, Homer Boyd, 415 Summit St., Grove City, Pa.

Strittmatter, Wallace Stephan, 425a N. Illinois St., Belleville, Ill.

October 27, 1952

Adams, Barbara, 18 Rochester St., Lima, N. Y.

Adams, Barbara Francis, Pirineos 635, Mexico 10, D. F., Mexico.

Aho, Grace Marie, 1028 W. Dayton St., Madison, Wis.

Asarnow, Martin Philip, 84 Hobson St., Newark 8, N. J.

Atkinson, Marilyn June, R. R. 1, Hudson, Wis.

Augustin, Edwin Beecher, Woodrow Wilson Rehabilitation Center, Fishersville, Va.

Aumueller, Blanche Anna, 5360 W. Fond du Lac Ave., Milwaukee, Wis.

Beirponch, Michael, 240 Martin, Hartford, Conn.

Bell, Jane, Bellwood Pl., Orangeburg, S. C.

Below, Bonnie Lou, 328 Garfield St., Stanley, Wis.

Bemis, Suzanne Harwood, 4747 21st N. E., Seattle 5, Wash.

Berberian, Albert J., 64 Circuit St., Roxbury, Mass.

Blomgren, Carol Virginia, 330 Rogers St., Milton, Wis.

Braatz, James H., 609 W. Graham Rd., Richmond, Va.

Brown, Robert Preston, Jr., 102 W. Mason Ave., Alexandria, Va.

Bryan, Martha, 606 Second Ave., Opelika, Ala.

Burks, Raymond Albert, 1631 Johnson Rd. N. E., Atlanta, Ga.

Chelemsky, Samuel, 5243 Lebanon Ave., Philadelphia 31, Pa.

Clifton, Via Virginia, % Mrs. William J. Murray, 3200 Kenilworth Ave., Hyattsville, Md.

Cook, Mary Jo, 201 N. 21st Ave., Hattiesburg, Miss.

Dixon, Malcolm Callaway, 54 New York Ave., Brooklyn 16, N. Y.

Dobbs, Jo Kathryn, 2909 Central Ave., Birmingham, Ala.

Duerr, Richard Michael, Jr., 2646 N. Bremen St., Milwaukee, Wis.

DuLaney, Albert Robert, 5355 Waveland Ave., Chicago 41, Ill.

Emery, Lyle Carson, 1217 N. 26th St., Lincoln, Nebr.

Erickson, Mary Ann, 1653 N. Marshall St., Milwaukee, Wis.

Flowers, Nancy Carolyn, 813 Poplar Blvd., Jackson, Miss.

Fryer, Charles Martin, 1006 Freeman St., Bronx 59, N. Y.

Garrison, Martha Bird, Box 366, Clarkesville, Ga.

Golson, Ruth, 118 First St., Prattville, Ala.

Goudelock, Ann Hamilton, 505 S. Hayne St., Monroe, N. C.

Hanson, Helen Alice, P. O. Box 155, Walden, Colo.

Hauenstein, Spencer William, 546 Valley Rd., Upper Montclair, N. J.

Hirokawa, Richard T., 1739 Huli Lane, Honolulu, Hawaii.

Hoffland, Nancy Mary, 1042 Spaight St., Madison, Wis.

Holmes, Willard Powell, 72 Brett, Brockton 8, Mass.

Hornbeck, Shirley Louise, Holcolm Lane, P. O. Box 1966, Reno, Nev.

Hull, Howard, 285 Irving Ave., Brooklyn 37, N. Y.

Humphrey, Tommy Lee, 12486 El Merrie Del., San Fernando, Calif.

Jacoby, Robert, P. O. Box 74, Hub Station, Bronx 55, N. Y.

Johnson, Lois Ruth, 3140 32nd Ave. S., Minneapolis 6, Minn.

Johnston, Judith Elaine, Box 917, Delray Beach, Fla.

Jones, Shanna Lee, 1106 Shrader, San Francisco, Calif.

Kahn, Anne, 1106 California Ave., Peoria, Ill.

Kamb, Ronald Eugene, 2427 Roosevelt Ave., Richmond, Calif.

Kampmeier, Lois Jean, 1322 Edanola Ave., Lakewood 7, Ohio.

Kemp, Richard Brenne, 4515 N. St. Louis Ave., Chicago 25, Ill.

Kossack, Samuel, 2054 Harrison Ave., New York 53, N. Y.

Koster, Jack Warren, 1430½ Harrison St., Davenport, Iowa.

Kuhnert, Mary Martha, Market St., Nekoosa, Wis.

Lamberson, Martha Ellen, R. R. 2, Connersville, Ind.

Lenn, Kaye Bailey, P. O. Box 126, Heron, Mont.

Levesque, Mary Ann, Enfield, N. H.

Lillis, John Francis, 641 Liberty Ave., Jersey City, N. J.

Lueth, Betty Irene, R. F. D. 1, Harvard, Ill.

Luhdorff, Elaine Elinor, 33 Pershing Ave., Woodland, Calif.

MacDonald, Mary Elizabeth, 2228 Victoria Ave., Windsor, Ont., Can.

Mandragos, Dorothy S., Rt. 1, Box 40, Brandywine, Md.

Markoff, Richard Allen, 815 Hick St., Brooklyn 31, N. Y.

Martin, Mary Katherine, 223 S. E. Third St., Evansville, Ind.

McCarrell, Walter Leon, Rt. 1, Travelers Rest, S. C.

McKenzie, Donald Kennedy, 2320 Tremainsville Rd., Toledo 13, Ohio.

Melnicki, Alexander C. H., 85 Emerson Pl., Brooklyn 5, N. Y.

Mende, Elizabeth Rae, 2508 Melbourne Ave., Richmond 23, Va.

Mickelborough, Ramona Gladys, Box 693, Port Sulphur, La.

Miller, Anne Bowie, 1016 Massachusetts Ave. N. E., Washington, D. C.

Molnar, Margaret O., 16316 Throckley Ave., Cleveland 28, Ohio.

Nelson, Yvette Eloise, 1578 Pimpernel Ave., Baton Rouge, La.

Nilson, Patricia, Old Post Rd., Walpole, Mass.

Niquette, Mary Lois, 2017 Main St., New Holstein, Wis.

Orleans, Sarah Grace, 100 Arden St., New York 34, N. Y.

Pigeon, Pauline Yvette, 1823 P. St. S. E., Washington 20, D. C.

Portnoy, Miriam D., 320 W. 87th St., New York, N. Y.

Pozarny, Louis, 196 Brunswick Blvd., Buffalo 8, N. Y.
Prince, Dudley Edward, 323 Main St., Norwalk, Conn.
Reed, Doris Elizabeth, 422 Cayuga Hts. Rd., Ithaca, N. Y.
Reimer, Erika Katherine, 2933 N. 7th St., Milwaukee, Wis.
Resch, Caroline S., 111 Dunham Rd., De Witt, N. Y.
Rhodes, Eloise, Crippled Children's Bur., State Health Dept., Richmond 19, Va.
Rieder, Edward Elliott, Grasslands Hospital, Valhalla, N. Y.
Ropes, Margaret Ann, R. D. 1, East Sparta, Ohio.
Scotten, Shirley Anne, 4424 Hastings, El Paso, Texas.
Sneed, Sara W., 301 College Ave., Ashland, Va.
Solomon, Morris, 850 Southern Blvd., Bronx 59, N. Y.
Swanson, Mary Marshall, Linden Ave., Branford, Conn.
Szwalek, Leo Francis, 140 Glendale Ave., Saginaw, Mich.
Thomas, Melba Lenora, 1766 W. Ninth, Jacksonville, Fla.
Thomas, Owen Penri, 1359 N. 79th St., Seattle, Wash.
Tucker, William Earl, Jr., 24 Dunvegan Rd., Catonsville, Md.
Ussher, Beth, 128 E. Pedregosa St., Santa Barbara, Calif.
Van Ark, Virginia, 123 N. East St., Eaton Rapids, Mich.
Vaughan, Marjorie Louise, 37 Quincy Pl. N. E., Washington, D. C.
Wald, Marilyn Muir, 3430 7th Ave., Rock Island, Ill.
Walters, Margaret Jean, 1510 75th St., Kenosha, Wis.
Wheeler, Glen Leslie, 301 N. Lake St., Madison, Wis.
White, Nancy, 417 S. 13th Ave., Bozeman, Mont.
Wiseman, Raymond Robert, Rt. 2, Box 2135, Rio Linda, Calif.
Wood, Mary Kathleen, 1383 Mathews Ave., Lakewood, Ohio.
Zimmerman, Robert Norman, 42-43 195th St., Flushing 58, N. Y.

November 3, 1952

Allen, Wayne Francis, Box 104, Dillon, Colo.
Bowdish, Eugene Robert, 935 E. College St., Iowa City, Iowa.
Bretz, Ruth Lee, 214 Fourth St., Huntingburg, Ind.
Childs, Gretchen Baker, Twin Orchards, Hampden, Mass.
Collier, Nancy, R. R. 1, Elkhart, Ind.
Cornell, Leone Daphne, 323 E. Madison, Wheaton, Ill.
Davies, Evan Vaughan, 330 First St., Slatington, Pa.
Edd, Carl A. B., 547 Simmons Ave. S. E., Huron, S. Dak.
Emel, Thomas Dean, 1630 W. 6th, Hastings, Nebr.
Floyd, Carla Joanne, P. O. Box 1223, Winter Park, Fla.
Fouhy, Phyllis Rose, 452 New Scotland Ave., Albany, N. Y.
Gillespie, Robert Wise, 5520 N. Federal Blvd., Denver, Colo.
Gordinier, Mary Tait, 1280 Albion St., Denver 7, Colo.
Henry, Mary Anne, C.M.R., 158 Detweiller Dr., Peoria, Ill.
Hilfrank, Marcia Bodden, 219 Melrose St., Melrose, Mass.
James, Herma Helene, 228 W. 14th Ave., Denver, Colo.
Kaneko, Alice Miyoko, 5562½ W. Adams Blvd., Los Angeles 16, Calif.
Keith, Leonard Vane, 1105 Maple Ave., Tempe, Ariz.
Kelly, Helen Colleen, 1155 Grove Terr., Dubuque, Iowa.
Kelly, Jeanne Ellen, Westbranch, Mich.
Kitagawa, Mieko Margaret, 4004 Garfield, S., Minneapolis, Minn.
Knubel, Helen Alice, 43 Rockland Pl., New Rochelle, N. Y.
Kortemeyer, Elmer John, Jr., 3800 S. Galapago, Englewood, Colo.
Kortemeyer, Joy Gillespie, 3800 S. Galapago, Englewood, Colo.
Larson, Phyllis Ann, 502 Bevington Rd., Pittsburgh 21, Pa.
Lint, Joan Peggy, 353 Beach 143rd St., Rockaway Beach, N. Y.
Lisensky, Mary Herrick, 805 Clearview Ave., Crafton 5, Pa.
Martin, Donald Francis, 1428 Douglas St., Sioux City, Iowa.
McKinsey, Sara Jane, Helen Furnace, Pa.
Meyer, Margot Lambert, 31 Virginia Ave., Poughkeepsie, N. Y.
Miller, Norman Eugene, 1043½ Third St., Knoxville, Iowa.
Moody, Gene Ervin, Arcadia, Nebr.
Ohler, Robert Walter, 816 Ohio St., Alliance, Ohio.
O'Malley, William Bernard, 2207 Willis Ave., Perry, Iowa.
Pax, Dorothy Jane, 531 E. Anthony St., Celina, Ohio.
Proctor, Frederick John, 252 Hawkeye Village, Iowa City, Iowa.
Rathje, Erna Maurine, R. R. 1, Atkins, Iowa.
Sawyer, Evelyn Jule, 800 Loraine, Springfield Ill.
Skowlund, Helen Virginia, 17 Saratoga Ave., Oshkosh, Wis.
Smith, Sarah Irene, 1230 Western Ave., Albany, N. Y.

November 6, 1952

Angelici, Charles Pio, 3333 Portola Ave., Pittsburgh 14, Pa.
Barnhart, James Austin, 714 Brookwood Rd., Baltimore 29, Md.
Baudendistel, Helen Rose, 330 Casey Ave., Richland, Wash.

Brown, Shirley Irene, 1641 Monsey Ave., Scranton, Pa.
Christoffersen, Dorothy M., 1915 N. 74th Ave., Elmwood Park, Ill.
Collazo, Carmen, 201 Dieg de Andino St., Santurce, P. R.
Cope, Patricia Ann, 1044 Glamorgan, Alliance, Ohio.
Coursey, Junie Mae, 909 Fifth North St., Vicksburg, Miss.
Crawford, Garfield, 143 E. Newcomen St., Alcoa, Tenn.
Darkey, Doris Jean, Daily, W. Va.
Day, Delores Beth, 1625 S. East St., Lebanon, Ind.
Deaska, Mary Virginia, 7530 S. Coles Ave., Chicago, Ill.
Dworschak, Walter, 103 Johnson Ave., Malverne, N. Y.
Eary, Bessie Jones, 519 E. Main, Flushing, Mich.
Eiseman, Mary Alice, 4514 Amherst Lane, Bethesda 14, Md.
Evans, Audrey Louise, 220 N. Wilmette Ave., Westmont, Ill.
Graham, Elizabeth Anne, 1446 Greenmount Ave., Pittsburgh 16, Pa.
Greenberg, Victoria Lia, 600 W. 146th St., New York 31, N. Y.
Grime, Hazel Eleanor, 16 Milford St., New Bedford, Mass.
Hancock, George Dewey, Jr., James Ave., Shrub Oak, N. Y.
Heil, Carolyn Louise, 262 Graham St., Carlisle, Pa.
Helpy, Mary Lucy, 120 Center Ave., Pitcairn, Pa.
Hirschberger, Gloria Ann, R. 616, Somerset St., Johnstown, Pa.
Hufsey, James Coleman, 24 Cedar St., Millville, N. J.
Ireland, James Francis, 204 7th Ave., Carnegie, Pa.
Jackson, Wilmotine Brenda, 58 Solomon St. S. E., Atlanta, Ga.
James, Alice MacLean, 126 Simmons Ave., Cohoes, N. Y.
Janov, Howard George, 37 W. Centre St., Mahanoy City, Pa.
Jervis, Margaret Elizabeth, 414 E. Ainsworth Circle, Ypsilanti, Mich.
Karaveckas, Petronella D., 247 W. 7th St., Mt. Carmel, Pa.
Kern, Clifford William, P. O. Box 53, Patterson Creek, W. Va.
Kopler, Doris Jean, 1207 Frankstown Rd., Johnstown, Pa.
Kraft, Esther, 4715 Pulaski Ave., Philadelphia 44, Pa.
Kruse, Louis Harvey, R. D. 4, Box 482, Pittsburgh 9, Pa.
Kuhns, Jean Verner, 7937 Maderia St., Pittsburgh 21, Pa.
Lange, Gloria Lillian, 300 S. Cornell Ave., Villa Park, Ill.
Lavin, Edwin, 5354 Locust St., Philadelphia, Pa.
Lazorchak, Vera, R. 541, Maple Ave., Johnstown, Pa.
Lindberg, Joan Miriam, 507 Orchard Lane, Winnetka, Ill.
Lyons, John Joseph, R. D. 1, Downingtown, Pa.
Malcolm, Jean Crandall, 517 Prescott Rd., Merion, Pa.
McCauley, Catherine Mary, 215 Marshall Ave., Collingdale, Pa.
McDougall, Richard Vincent, Fredonia, Pa.
McNally, JoAnne Eugenia, 31 N. Walnut St., Blairsville, Pa.
Mehalko, Charles, 148 Third St., Vintondale, Pa.
Merwin, Alice, 39 Walworth Ave., Scarsdale, N. Y.
Mitinger, Lucy Kathleen, 116 Talbot Ave., Greenburg, Pa.
Neill, William III, 3917 Canterbury Rd., Baltimore 18, Md.
Nordlund, Thora Esther, 17 Schaefer Rd., Maplewood, N. J.
O'Connor, Paul Gregory, 4 Stuart Ave., Glenolden, Pa.
Paden, Jeanne, 1415 Baffin Rd., Glenview, Ill.
Pears, James E., 502 Bell Ave., New Castle, Pa.
Perrin, Esther Mae, 558 Baptist St., Greenwood, S. C.
Peters, Howard Klemmer, Jr., 48 E. Johnson St., Philadelphia 44, Pa.
Pujals, Charles, Jr., 4139 68th St., Woodside, L. I., N. Y.
Ray, Zehra Gene, Sledge, Miss.
Reven, Joan Mors, 201 S. George St., Mt. Prospect, Ill.
Riebel, Sister Mary Florentia, 502 E. Oklahoma Ave., Enid, Okla.
Rodriguez, Lumida, Box 784, Caguas, P. R.
Rogers, Shirley Ann, 236 Columbia Ave., Elyria, Ohio.
Stephenson, Marjorie Janine, 220 W. 4th St., Greensburg, Pa.
Sumner, Katherine Black, 715 Broad St., Sewickley, Pa.
Swenson, Norman Robert, 221 4th St., East Northport, N. Y.
Taslitz, Norman, % A. E. Felt, 306 Highland Ave., Madison, Wis.
Webb, Patricia Fuller, 723 Linden Ave., Oak Park, Ill.
Westcott, Joy Nadine, Box 225, Soledad, Calif.
Wilds, Nancy Alexander, 3908 Chestnut St., Philadelphia 4, Pa.
Willard, Marion Joyce, Oxford Rd., Southport, Conn.
Zastrow, Grace Lorraine, Nashotah, Wis.

BOOK REVIEWS

The reviews here published have been prepared by competent authorities and do not necessarily represent the opinions of the American Congress of Physical Medicine and Rehabilitation.

PHYSICAL MEDICINE IN GENERAL PRACTICE. Edited by *William Bierman*, M.D., and *Sidney Licht*, M.D., with twenty-two contributors. Third edition. Cloth. Price, $12.50. Pp. 798, with illustrations. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, 49 East 33rd St., New York 16, 1952.

This third edition of Physical Medicine in General Practice, which has long been considered one of the standard reference texts, is edited by Dr. William Bierman and Dr. Sidney Licht and contains chapters written by 22 authorities in physical medicine and rehabilitation. Although this book follows the same general outline of organization as did previous editions, it actually represents a complete revision of the former editions. Outmoded material and techniques have been eliminated. Authoritative new chapters have been added to include such subjects as ultrasound, microwave diathermy, neuromuscular re-education, functional muscle testing, manipulation and the care of the amputee. Also many additional illustrations have been included.

This volume gives comprehensive coverage to modern concepts and newer developments in the field of ohysical medicine and rehabilitation. The chapter on ultrasound is a particularly well balanced approach to the clinical use of a new therapeutic agent. The chapter on occupational therapy, written by Dr. Licht who has ably devoted so much energy to the furtherance of this field, gives an excellent evaluation of its various forms and their practical applications. The chapter on medical rehabilitation also deserves special commendation for its concise yet comprehensive discussion of various phases of rehabilitation.

It is difficult to find any important section of this book to criticize since it is on the whole very well written and edited. However, a few minor points might be mentioned. In the discussion concerning heating of tissue that occurs in short wave diathermy, mention is made of "ohmic resistance" and "conductive" and "displacement" currents; it is this reviewer's impression that such terms are now obsolete and that it is better to speak of "tissue impedance" and "electromagnetic flux" when discussing the theory of heating with diathermy. Also electric and magnetic fields cannot be separated in such apparatus. One other point: in the chapter on Visible and Infrared Radiation the reader is left confused as to whether significant increase in blood flow could or could not occur upon exposure to infrared radiation.

This book definitely fills the present need for an up-to-date textbook in physical medicine and rehabilitation. It should be in the library of every physiatrist. In addition, many physicians in general practice and in various specialties will find it a valuable reference work.

THE STORY OF THE ADAPTATION SYNDROME. (Told in the Form of Informal, Illustrated Lectures.) By *Hans Selye*, M.D. Ph.D., (Prague), D.Sc. (McGill), F.R.S. (Canada). Professor and Director of the Institut de Medecine et de Chirurgie experimentales Universite de Montreal. Leather, $4.50. Pp. 225, with illustrations. ACTA, Inc., 5465 Decarie Blvd., Montreal 29, Que., Canada, 1952.

There are many among us who after diligent effort to master the impressive content of Selye's recent monograph, "STRESS," had felt the need for some informal but official commentary through which to grasp its kaleidoscopic implication. The many who recognized the highly specialized quality of its formal discourse had frequently manifested their personal desires to the author during his lectures for some extracurricular text, to more readily increase their orientation of his general adaptation concept in relation to its clinical import.

The title of the book gives it the character of its discussion. It relates the story of the adaptation syndrome within the frame of biographic incidences as developed from direct contact with diverse groups of medical students, physicians and laboratory experiences during his lectures in Europe and in the Americas as compiled from edited wire-recordings. These unprepared and spontaneous discussions proved more stimulating according to Selye's observation "than my laboriously compiled, extensive monographs, which attempted to present the entire relevant literature in a systematic manner." Thus this volume is not altogether a summary of past conclusions but an extension of its thesis through the intimate channels of personal experiences, leading to the clearer understanding of its universal biologic implications. In the space of seven lectures the author carries the reader through nearly two decades of continuous experiences of the gradual evolution of a brilliant concept of the nature of biologic stress and the dynamics of the adaptive syndrome as it is realistically evaluated under the most exact laboratory tests, resulting in one of the most profound hypotheses contributed to modern medicine. As Selye puts it, it proves that "the great problem of endocrine physiology

is no longer what the hormones do, but what adaptive reaction they influence." Similarly, endocrine pathology "is no longer what or which disease is caused by excessive function or destruction of an endocrine gland, but in which disease has the endocrine status a decisive influence." Finally there emerges from this concise and provocative exposition a literary contribution, exemplary for its rhetorical beauty and subtle humor, the Keystone conclusion being that the main object of this study is no longer the problem of individual "pathogens," but rather pathogenic situations under stress of some 25 etiologic biophysical, physiologic and chemical factors under a flexible destiny of the biologic adaptation syndrome.

ADMINISTRATIVE MEDICINE. *Haven Emerson*, A.M., M.D., Editor. Cloth. Price, $10.00. Pp. 1007. Thomas Nelson & Sons, 19 E. 47th St., New York 17; Parkside Works, Dalkeith Road, Edinburgh 9, 1951.

The editor of Administrative Medicine points out in the introduction that many persons are familiar with the objects, methods, organization and results of some medical administration with which they are connected in an employed capacity; that they also come into personal relation with one or many of the voluntary or governmental agencies of medical service each year whether they seek personal care in sickness or receive in a direct or remote way some protection from the local or state department of health.

Few physicians or representatives of the laity are, however, even superficially acquainted with the wide scope, varied character and close interrelationship of the many public facilities for organized care of the sick and for public health. It is primarily to bring to physicians a more precise description of the functions and organization of these institutions and agencies that persons of experience and authority in the various special fields of administrative medicine have collaborated as authors for this volume.

The scope of administrative medicine falls under two broad subdivisions: organized care of the sick and public health. The term organized care of the sick is defined by listing the following special functions: Hospital care for bed patients; out-patient care for the ambulatory sick; convalescent homes to complete recovery; care of the chronically ill; visiting nurse service for the sick at home; medical social service; home medical care; rehabilitation. A precise definition of public health as a community service is given as "the application of the sciences of preventive medicine through civil government for social ends."

The book is divided into four parts, contributed by fifty-eight authors and contains 1007 pages. Part I presents the development of organized care of the sick in its chronologic sequence from its original and still most important function of general hospital care of bed patients; the special purpose institutions for the communicable diseases, tuberculosis, mental and other chronic diseases are described with appropriate detail; the needs of the convalescent patient, home nursing and medical care under professional supervision, development of social service with an added chapter on rehabilitation, recognized as a third phase of medical care. In Part II services for the sick by the federal government as a civilian and military agent of the people and by institutions of higher education are described, and chapters on voluntary prepayment plans for medical care and some of the basic principles of medical economics are presented. Part III deals with the structural authority and organization of public health services from the basic local government unit through states and provinces and among the nations to the international development but recently consummated in the World Health Organization. Part IV is devoted to a somewhat detailed description of the great variety of functions included within the scope of contemporary public health performance in the United States.

This book is well organized and very readable, presenting much detail on administrative medicine, with which many doctors are not well acquainted. This book certainly belongs in every medical library.

THE KNEE AND RELATED STRUCTURES: INJURIES — DEFORMITIES — DISEASES — DISABILITIES. By *Philip Lewin*, M.D., F.A.C.S., F.I.C.S. Professor and Chairman of Department of Bone and Joint Surgery, Northwestern University Medical School; Attending Orthopedic Surgeons, Cook County Hospital; Senior Attending Orthopedic Surgeon, Michael Reese Hospital; Professor of Orthopedic Surgery, Cook County Graduate School of Medicine, Chicago; Formerly Colonel, Medical Corps, A. U. S. Cloth. Price, $16.00. Pp. 914, with 33 illustrations and 2 colored plates. Lea & Febiger, 6000 S. Washington Sq., Philadelphia 6, 1952.

In this excellent text no effort is spared in making available to the reader all aspects of medicine as relates to the knee, including anatomy, physiology, pathology and clinical diagnosis, x-ray changes, methods of treatment both conservative and surgical, and prognosis. It is based on the author's extensive experience and reports from the literature. The book is profusely and well illustrated, attractively bound and printed, and authoritatively documented by an extensive bibliography. The approach is somewhat didactic, including many charts and "rules of thumb" so popular for teaching purposes. The emphasis is on clinical description and diagnosis, including conservative treatment, rather than on details of operative procedures. Physical Medicine is not omitted, although the term does not appear in the index, whereas the rather outdated term phototherapy does; on the other hand, special mention is made of progressive resistance exercises, although they are not noted in the index.

This is certainly a text the orthopedist and physiatrist will wish to have available for easy reference in his library. It is suggested that for future editions a physiatrist be consulted to edit references to physical medicine in treatment of

knee conditions; that the index be enlarged considerably, since this is essentially a reference text; and that the bibliography either contain direct references to the text or be grouped according to subject matter.

TEXTBOOK OF ENDOCRINOLOGY. By *Hans Selye*, M.D., Ph.D. (Prague), D.Sc. (McGill), F.R.S. (Canada), Professor and Director of the Institut de Medecine et de Chirurgie experimentales Universite de Montreal. Second Edition. Fabrikoid. Price, $13.50. Pp. 914, with illustrations. Acta Endocrinologica, Inc., 5465 Decarie Blvd., Montreal 29, Que., Canada, 1950.

The popularity of this text of endocrinology is attested to by this the fourth printing (1950) of the second edition (1949). Once again the text represents the best as a standard textbook of vertebrate endocrinology. It consists of twelve chapters, covering the more important and established facts of all branches of the science of endocrinology. It is a well written, concise, well balanced exposition containing many excellent illustrations. In this the second edition, in addition to the inclusion of new and important key references and more suitable illustrations, the section "Commercial Hormone Preparations" has been rewritten. The publishing is excellent and the text is highly recommended for use by medical students and physicians as well as specialists.

MY FIGHT TO CONQUER MULTIPLE SCLEROSIS. By *Hinton D. Jonez*, M.D., as told to Miriam Zeller Gross. Cloth. Price, $3.50. Pp. 227. Julian Messner, Inc., 8 West 40th St., New York 18, 1952.

This is a fascinating and absorbing story of Doctor Jonez' five year fight against Multiple Sclerosis, waged at the Multiple Sclerosis Clinic of St. Joseph Hospital, Tacoma, Washington. Participating in this fight were the Sisters of St. Francis, along with nearly two thousand men and women seeking relief from the ravages of this disease. Doctor Jonez states that most of these people have recovered sufficiently to live normal lives and practically all have lost their fear of multiple sclerosis. Doctor Jonez got his inspiration from Bayard T. Horton of the Mayo Clinic and the late Foster Kennedy, professor of neurology at Cornell University Medical College. Both of these men stated they believed multiple sclerosis could well be explained on the basis of allergy. Doctor Horton instead of using antihistaminics did just the opposite, he used histamine. The treatment at St. Joseph Hospital has been referred to as the "total push." It includes histamine — intravenous injections and ion transfer once the patient leaves the clinic so that treatment can be continued at home — curare, control of allergic manifestations, physiotherapy and psychotherapy (better known, states the author, as T. L. C., or tender loving care). This book is written for the layman and gives the story of the patients who came to the clinic, their condition before and after treatment. August 15, 1952, a new $200,000 clinic was to be opened as the St. Joseph Hospital Clinic for Demyelinating Diseases which is quite a step from its humble beginnings. Dr. Jonez is certainly an unusually sincere and dedicated man and if history vindicates his thesis and results, he will have made a contribution to medical science of inestimable value.

Every general practitioner should read this story even though it is written in a popular style. This does not detract from the actual facts presented nor obviate the medical opposition he encountered. On request the publishers included an excellent presentation on Multiple Sclerosis delivered by Doctor Jonez before the 36th Annual Meeting of the Interstate Postgraduate Medical Association of North America at St. Louis, October, 1951. This book is highly recommended.

MEN, WOMEN, AND MORALS. By *Sylvanus M. Duvall*, Professor of Social Science and Religion, George Williams College. Cloth. Price, $3.75. Pp. 336. Association Press, 291 Broadway, New York 7, 1952.

The author bases this book on the conviction that people have a right to sound guidance regarding sex conduct and standards, based upon the best scientific knowledge and deepest insights available. The book is concerned primarily with sexual morality. The study is presented in four sections comprising sixteen chapters. Section one, is entitled "Where are we now?" with three chapters as follows: the old order changeth—it is time to take stock; what has happened; and the scientific approach to sex morals. Section two is entitled "How sex conduct affects people," with a chapter given to the physical results, psychological effects, and the social results of sexual intercourse. Section three discusses sex morality in specific situations. Section four is entitled "Sex morality in larger contexts." The volume closes with an appendix which includes "A Manifesto on sex standards, a summary, a bibliography and the usual subject index as well as an author's index. This is an admirably written book for the educator, the religious leader and layman. It is well written and should find a ready audience. This book is highly recommended to those who have become confused with the changing morality of our rapidly moving period.

KINESIOLOGY IN NURSING: LABORATORY MANUAL. By *Bernice Fash*, M.A., University of Illinois, Cook County School of Nursing. McGraw-Hill Series in Nursing, Lucile Petry, Consulting Editor. First Edition. Paper. Price, $2.80. Pp. 142, with 102 illustrations by Paul H. Stone. McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 18; Aldwych House, Aldwych, London, W.C.2, 1952.

This laboratory manual covers material far too much advanced for nurses which, in the opinion of the reviewer, makes it somewhat impractical. It appears to have been written by a physical educator who has a very limited knowledge of nursing and its problems. It certainly does not appear to be the province of the nurse to make a muscle analysis of the patient and to prescribe

exercise. These are both functions of the physiatrist, or, if he is not available, then the physical therapist, may fulfill this highly specialized function. It is sufficient to teach nurses good body mechanics for their own health and the proper use of their body so as to avoid strain and fatigue when attending the patient. The book does, however, have some practical value in illustrating the proper transportation and handling of bed patients. There are two parts: Part one gives a good set of rules applied to recumbency, rules applied to coordinated movement, and joint muscle function. Part two deals with kinesiology in nursing, discussing positions of recumbency, getting the patient out of bed, and crutch walking. A good bibliography is appended as well as an excellent list of visual aids. This manual will not fill the need of the nursing profession nearly as well as Winters "Protective Body Mechanics in Daily Life and in Nursing." Winters' book seems to have grasped the real essentials probably because she is both a nurse and physical therapist.

DISEASES OF THE EAR, NOSE AND THROAT. PRINCIPLES AND PRACTICE OF OTORHINOLARYNGOLOGY. CLINICAL TECHNIQUES AND PROCEDURES. By *Francis L. Lederer,* B.Sc., M.D., F.A.C.S., Professor and Head of the Department of Laryngology, Rhinology and Otology, University of Illinois College of Medicine, Chicago; Chief of the Otolaryngological Service, Research and Educational Hospital; Captain, Medical Corps, United States Naval Reserve; Director of Otolaryngology and Chief of the Ear, Nose and Throat Service, Illinois Eye and Ear Infirmary. Sixth Edition. Fabrikoid. Price, $20.00. Pp. 1430, with 979 illustrations, 20 in color. F. A. Davis Company, 1914 Cherry St., Philadelphia 3, 1952.

It is indicated in the preface of this text that "The main purpose of this expanded work is to provide encyclopedic information in the specialty of otolaryngology." This purpose has certainly been achieved. The first four sections are devoted one each to the ear; the nose and paranasal sinuses; the mouth and pharynx; and the larynx trachea, bronchi, and esophagus. Each of these sections begins with a consideration of the anatomy physiology and method of examining the particular region discussed. There then follows a rather comprehensive consideration of the diseases of each of these regions. A fifth section entitled "General and Correlated Considerations" picks up the loose ends, so to speak, and considers diseases closely related to the field of otolaryngology. A few of the topics discussed in this section are neuralgia of the head and neck, allergy, enlargements of the head and neck, ophthalmological aspects, and the psychosomatic approach to otolaryngology. A chapter dealing with disorders of speech and voice will be of special interest to physiatrists concerned with rehabilitation problems in this field.

The format of the text is most attractive and it is deserving of special commendation for the 979 very excellent illustrations. The text is devoid of bibliographic material. It will be of value particularly to the medical student as a text book, but will also provide any physician with valuable information regarding the field of otolaryngology.

REHABILITATION NURSING. By *Alice B. Morrissey,* B.S., R.N. Instructor in Rehabilitation Nursing, New York University-Bellevue Medical Center; Supervisor of Nursing Service, Department of Physical Medicine and Rehabilitation, Bellevue Hospital. Cloth. Price, $5.00. Pp. 299, with illustrations. G. P. Putnam's Sons, 210 Madison Avenue, New York, 1951.

The purpose of this volume is to emphasize the modern concepts of a nursing service in a rehabilitation center. The author is eminently well qualified to write concerning this subject since she has been associated with one of the largest and best equipped rehabilitation centers in this country, working under the leadership of Dr. Howard A. Rusk and Dr. George G. Deaver. The book is divided into three sections: (1) The Meaning of Rehabilitation, which includes an excellent and brief historical survey, cites figures concerning the incidence of various disabilities and discusses the nurse's role in rehabilitation; (2) Nursing Principles and Procedures in Rehabilitation, which contains valuable information concerning prevention of deformities and decubital ulcer, training of bowel and bladder in paraplegics and teaching the activities of daily living; and (3) Nursing Practice in Rehabilitation, which discusses general nursing care of patients with the more common disabilities. Although the author has intended this volume primarily for nurses and nursing students, it is also recommended to all physicians who treat patients with rehabilitation problems, to physical therapists and occupational therapists and students in these fields, and even to selected lay people, who might profit by better understanding of nursing problems in management of such patients. This volume is clearly written and carefully edited; its illustrations are well chosen and reproduced. The author should be commended for presenting so readably the contributions that nurses can make in working with the physician toward the rehabilitation of the disabled.

INJURY OF THE XIPHOID. By *Michael Burman,* M.D., and *Samuel E. Sinberg,* M.D. Cloth. Price, $3.50. Pp. 92, with illustrations. Columbia University Press, 2960 Broadway, New York 27, 1952.

The xiphoid, called the "inhospitable host," is responsible for various symptoms and signs many of which are attributed to other structures. Even the absence of the xiphoid, or axiphoidea, has clinical significance, whereas a large xiphoid is a "sign of masculinity." "Xiphoidalgia" may be a primary or a secondary disease and reasons and examples are given. Direct trauma to this structure, particularly frequent today due to steering wheel injuries, and need for its removal, are discussed at some length. This small monograph by calling attention to the lowly xiphoid as a possible cause of various disorders has a justifiable purpose.

TREATMENT BY MANIPULATION. By *H. Jackson Burrows*, M.D., F.R.C.S., F.R.A.C.S., Orthopedic Surgeon, St. Bartholomew's Hospital, London, and *W. D. Coltart*, M.B., F.R.C.S., Assistant Orthopedic Surgeon, St. Bartholomew's Hospital. Second Edition. Cloth. Price, 12s. 6d. Pp. 80, with 29 illustrations. Published on behalf of "Practitioner," 5 Bentinck St., London, W.1, by Eyre & Spottiswoode, 15 Bedford St., Strand, London, W.C.2, 1951.

This is the second edition of a work that first appeared eleven years ago. The original plates were destroyed during the war, so that this edition contains new type and illustrations.

Manipulation, according to the authors, is the "forcible movements which may be used at a single sitting" usually given under the effect of some types of anesthetic, and is not the passive movements as given by the physical therapist. The importance of the correct diagnosis, which is aided in most instances by a thorough physical and roentgen examination, is stressed. The various parts are presented with a brief description of the technique of the manipulation. The illustrations bring out the maneuver better than the printed text. This small volume makes no attempt to delve into the rationale of the methods; it gives merely the techniques as practiced by two skill. l orthopedists.

Undoubtedly manipulation when done by competent and experienced physicians has its place in therapy, particularly in the field of physical medicine. The preface of the book contains these remarks: "The profession has been charged with neglecting manipulative treatment and with dwelling on the disasters of the 'bonesetter' rather than upon his known successes. It may be that many members of the medical profession know too little of the selection of cases for manipulation, its technique and the results which may be expected from it."

THE HYPERSENSITIVE MIND IN NORMALS, NEUROTICS, PSYCHOPATHS AND PSYCHOTICS: Prevention and Treatment. By *Gabriel Langfeldt*, M.D., Professor of Medicine, Oslo, Norway. Acta psychiatrica et neurologica scandinavica, supp. 73. Paper. D.Kr. 20.00. Pp. 147. Ejnar Munksgaards Forlag, Norregade 6, Copenhagen, K, 1951.

This treatise develops the author's theory of the "hereditary-conditioned" factors and their reaction on the normal, psychoneurotic and psychotic individuals. He is particularly interested in the shy, timid child and the effect of various external forces. Numerous case reports are included to illustrate his ideas.

This reviewer believes the author raises a pertinent point concerning the development of neurotic reactions, applicable particularly in the U. S. A., which he explains as follows — "the steadily increasing taxation pressure . . . . brings about a tendency even in the people of otherwise high morals to deceive the authorities in respect to their incomes." He suggests "some amelioration of the social irritative forces will be necessary." Unfortunately not one politician will read these lines!

THE SCALP IN HEALTH AND DISEASE. By *Howard T. Behrman*, A.B., M.D., Assistant Clinical Professor of Dermatology, New York University Post-Graduate Medical School; Adjunct Dermatologist, Mount Sinai Hospital; Attending Dermatologist, Hillside Psychiatric Institute; Formerly Associate Dermatologist, Bellevue Hospital, and Assistant Attending Dermatologist, University Hospital; Fellow in Dermatology, New York Academy of Medicine; Member, Committee on Cosmetics, American Medical Association; Society of Cosmetic Chemists; Society for Investigative Dermatology; Fellow, American Academy of Dermatology; Diplomate, American Board of Dermatology. Cloth. Price, $12.75. Pp. 566, with 312 illustrations. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo., 1952.

There are few cutaneous diseases which do not at one time or another affect the scalp, and it is the mirror for many systemic diseases. From the cosmetic standpoint hair is expensive; millions are spent on hair and scalp care each year. There are hundreds of pseudoscientific organizations that prey on the public throughout the United States by advertising half-truths about scalp diseases. A sizable part of the practices of the general physicians and dermatologists consists of advising patients who, because of oily scalp and/or faces that feel "dry and tight," or an increasing scaliness of the scalp, find that oil treatments, pomades and creams for such conditions as "dry" skin, oily skin or medium dry and oily skin, merely serve to aggravate the condition; because neither the patients nor cosmetologists understand the paradoxical paresthesia of seborrhea. In this volume the author has collected and condensed a wealth of material on embryology, anatomy, anthropology, physiology and chemistry of the hair. In one section, the care of normal hair and scalp and the uses and dangers of various preparations and dyes are discussed. In the chapter on the alopecias, interesting opinions of the various theories of baldness are presented along with diagrams of the types of baldness. Peculiarly, women can also have a certain degree of male-type baldness. A chapter is devoted to the seborrheic diathesis. Chapters are concerned with infections of the scalp including bacterial, viral, fungous, parasitic, spirochetal infections and infestations. Discussions of scalp involvement from cutaneous, systemic and neoplastic diseases comprise other sections. Psychogenic scalp disorders of proved or presumptive origin are also considered. The clinical and histologic aspects, differential diagnosis, and etiology of the conditions are discussed together with treatment from both the systemic and local standpoints. Included are formulas for many scalp and hair preparations. The appendix includes an extensive therapeutic formulary. There is a comprehensive index. In this encyclopedic volume the author has gathered extensive scientific information concerning the hair and scalp from numerous dispersed sources and brought it up to date. The volume will be useful to stu-

dents, dermatologists, general physicians, and others who are interested in this phase of dermatology.

THE ELECTRICAL IMPEDANCE OF A COMPLEX TISSUE AND ITS RELATION TO CHANGES IN VOLUME AND FLUID DISTRIBUTION: A STUDY ON RAT KIDNEYS. By *Borje Lofgren.* Acta Physiologica Scandinavica. Vol. 23, Supplementum 81. Paper. Pp. 51, with 12 Illustrations. Almquist & Wiksells Boktryckeri AB, Uppsala, Sweden, 1951.

The author discusses the theory and technique of impedance measurements in living organs and shows how the application of this method enabled him to follow changes of volume in the living rat kidney. Strong solutions of histamine caused an increase in kidney volume, whereas strong solutions of acetylcholine caused a decrease sometimes followed by an increase. Epinephrine caused a decrease in kidney volume.

The subject of electrical impedance is fundamental in physical medicine but impossible to understand without considerable knowledge of double algebra and alternating currents. The author leaves no doubt as to his own command of the subject but his introductory statements are unclear and his diagrams, with the Y-axis pointing down instead of up, are confusing. The difficulties likely to be encountered by the novice trying to read an article of this kind cannot all be anticipated; the best way to discover them is to take a group of students through the subject in detail. In such a review, the semantic traps lurking behind phrases like "complex tissue" and "complex plane" or "phase angle" and "diphasic system" could be brought to light; and unresolved difficulties, which sometimes accumulate as the reader progresses until he bogs down under them, could be removed. Aside from this trouble, which is largely inherent in the abstruse subject, the book must be commended as a substantial and scholarly contribution to biophysics.

FRONTAL LOBOTOMY AND AFFECTIVE BEHAVIOR: A NEUROPHYSIOLOGICAL ANALYSIS. By *John F. Fulton,* M.D., Sterling Professor of Physiology, Yale University, New Haven. (Thomas William Salmon memorial lecture.) Cloth. Price, $3.00. Pp. 159, with 21 illustrations. W. W. Norton & Company, Inc., 101 Fifth Ave., New York 3, 1951.

This is one of a series of lectures given annually under the auspices of the New York Academy of Medicine to honor the memory of Dr. Thomas William Salmon, whose influence for the better treatment and prevention of mental disorders was extraordinary and world wide. The understanding, loyalty, and esteem of his colleagues are expressed in these series of memorial lectures that advance the causes of which he was a valiant pioneer.

While Fulton is a physiologist, it would have been most difficult to select a man more able to lecture in this continually changing and rapidly developing field of psychiatry. Dr. Fulton reviews work undertaken since 1948 by his staff and associates at Yale. Attention was devoted to behavioral problems in primates with especial attention to the anatomical and physiological background of the operation of lobotomy and frontal gyrectomy. He also reviews a number of the many clinical reports on lobotomy, which will be of marked interest to every clinician. The book is divided into four chapters. Chapter one discusses the historical background from the psychobiological approach. Chapter two discusses recent disclosures concerning the functional anatomy of the fronto-cingulo-temporal cortex. The author in chapter three gives an account of the newer behavioral studies carried out in monkeys, baboons, and chimpanzees. The final chapter is devoted to the broad theme of frontal lobotomy in relation to man.

The book is well written, easily read, and will be a most valuable addition to the library of every clinician. While Dr. Fulton surveys the frontiers of this fascinating field he never leads one beyond the depths of clinical understanding. This small volume is highly recommended.

ENDOCRINE DIAGNOSIS. By *H. Ucko,* M.D. Cloth. Price, $8.50. Pp. 513, with 84 illustrations. Staples Press, Ltd., 70 E. 45th St., New York 17; Staples House, 83 Great Titchfield St., London, W.1, 1951.

The author has divided his book into two parts. The first part consists of the differential diagnosis of endocrine symptoms and signs as related to the various body systems and geographic areas. The second part deals with specific diseases of the various endocrine glands.

The first part of the book is very clearly outlined and should be of definite help to the general practitioner and general internist in differentiating normal physiologic variations from endocrine disease. Especially well-covered is the normal physiologic endocrine changes which occur during development from infancy to adulthood and how they may be differentiated from endocrine disease. Of less value is the attempt to associate symptoms occurring in various parts of the body with certain types of endocrine disease. Physiologic disturbances that occur in the various systems in the presence of the different endocrine diseases are thoroughly and clearly outlined by the author, for example, the causes of osteoporosis and the causes of pigmentation. It is good to see the author make the point that obesity is not endocrine in origin. Part two of the book, which deals with the diseases of the endocrine glands, is very sketchily covered and will not be nearly so valuable to the general practitioner and general internist as is part one.

This book is recommended because of the excellent outline report on the differential diagnosis of endocrine symptoms and signs from nonendocrine disturbances. It is not nearly so valuable for discussion of diseases of the endocrine glands as are several other modern texts which cover this much more adequately.

PHYSICAL MEDICINE ABSTRACTS

Pole Top and Other Manual Resuscitation Methods: A Comparison Study. Archer S. Gordon; Max S. Sadove; Frank Raymon, and A. C. Ivy.

Indust. Med. 21:147 (April) 1952.

Comparative tests of pole top and manual resuscitation techniques, as carried out on normal adults curarized-anesthetized to total apnea, confirm the finding that push-pull methods are two to three times as efficient, as regards pulmonary ventilation, as either the push or the pull only methods. For general purposes the arm-lift back-pressure, (back-pressure arm-lift), modified from the Danish Nielsen method, should be used, since it is easy to teach, can be performed by most operators for prolonged periods of time, and gives excellent pulmonary ventilation without circulatory embarrassment. Trained personnel should also be acquainted with the hip-lift back-pressure and Silvester arm-lift chest-pressure methods to be used as ready alternatives in special circumstances.

The pole top method of resuscitation gives adequate ventilation, and should be instituted immediately in cases where linemen are shocked on the poles. However, since the vertical position predisposes to peripheral stasis and circulatory embarrassment, as well as impeding the drainage of fluids which may collect in the oropharynx, the victim should be lowered to the ground as soon as practical. The pole top method should be continued during the descent, and one of the more efficient push-pull methods begun as soon as he can be placed in the prone position.

Neurosurgical Aspects of Spinal Cord Injury. Edmund A. Smolik.

Mississippi Valley M. J. 74:38 (Mar.) 1952.

Spinal injuries in their neurosurgical aspects can be considered from various viewpoints. For simplicity, a classification based on anatomical derangement may be useful. In this category belong: (1) a. Cervical Neuritis; b. Cephalgia of Neuritic (Cervical) Origin; (2) Cervical Arthritis (Osteophytes); (3) Intervertebral Disc Rupture; and (4) Vertebral Fracture. Ideally, the patient should be hospitalized at rehabilitation centers. Here, the entire individual and problem become a matter of coordination in which the physical therapist, the trained nurse, the neurological surgeon, the neurologist, the psychiatrist, social service worker and the orthopedic surgeon work as an integrated team. Rehabilitation should be not only somatic but also psychic. Permanent braces, stimulation by early ambulation and physical therapy, as well as recreational activities, in the form of group therapy, are worth more than any isolated, operative maneuver.

Chronic Low Backache. F. X. Krynicki.

Indust. Med. 21:111 (Mar.) 1952.

Patients with a chronic low backache often experience an acute exacerbation of pain within five to fourteen days after wearing especially reinforced and corrected shoes. In the presence of greater irritative changes, intravenous procaine, heat, massage, and various oral and parenteral medications are employed in addition. The treatment is used regardless of the duration of the backache. If, however, after two weeks little progress is made, the next step is taken. To begin with, it is necessary to lessen or eliminate spasm which accompanies pain, and it has been found that bilateral, discontinuous traction of the partly flexed extremities is most suitable for this purpose. No traction is used at night and the usual anodynes are given the patient in the early stages of treatment. After the first two days, or when improvement seems apparent, the patient is given special shoes, which he is obliged to wear whenever he is up and about. After traction, the patient is observed for five days or a week, during which time he is given physical or medical treatment as mentioned above. If painful symptoms do not lessen, traction is reapplied for a second or a third time as indicated. Physical and medical treatment is continued for about six to twelve weeks, although some patients require less or more attention. When patients are refractive to an absolute degree in the first two to three weeks, and are definite about their condition, little of a conservative nature can be done for them.

Ultrasound and Industrial Medicine. Horace O. Parrack.

Indust. Med. 21:156 (April) 1952.

Ultrasound equipment is being used more and more extensively in industrial situations. It is used to detect flaws in materials, to determine certain properties of materials, to secure dispersion of solids in liquids (emulsion), for agglomeration of particles from liquids and gases, and many other jobs.

Ultrasound is being extensively used in biology and medicine, where its application may be classified under two general headings: (1) experimental studies using ultrasound, and (2) therapeutic methods utilizing ultrasound. The literature in these biological fields is already extensive, and more work is being undertaken daily.

The experimental studies in which ultrasound is employed usually have one of the following pur-

poses: (1) determination of the physical properties of the tissue studied; (2) determination of the mechanisms by which ultrasonic energy produces an effect on biological material; (3) determination of the effect of ultrasound on physiological functions of tissue; (4) evaluation of the usual function of the tissue area destroyed, or rendered nonfunctional, ultrasound being used as a tool to perform localized injury or destruction of tissue for this purpose.

Because various tissues and body structures have different capacities for reflecting or absorbing ultrasound it may be possible to utilize these effects in localizing or determining the dimensions of these structures. Foreign bodies or crystal secretions occurring in some part of the body may possibly be located by the application of ultrasonic waves. These applications are essentially diagnostic.

Ultrasonic energy also has been used for various therapeutic purposes, the most of these applications having been made in Germany. There still is much uncertainty as to its effectiveness. Certainly much caution should be exercised in therapeutic applications until it is established: (1) that ultrasound is an effective agent, and (2) that it can be applied in such a manner that it will not produce unexpected damage.

The question of the damaging action of airborne ultrasonics is discussed, and it is concluded that there is *no hazard*. It is pointed out that a probable hazard exists, and that this will increase as the use of ultrasonic generators increases. However, the authors conclude that control of these hazards should be a relatively easy task.

The Role of Physical Medicine and Rehabilitation in a Large Neuropsychiatric Hospital. Daniel Dancik.

J. A. M. A. **148**:921 (Mar. 15) 1952.

A physical medicine and rehabilitation service in a neuropsychiatric hospital, with its psychological orientation, its recognition of the importance of socially integrating the patient into the hospital milieu, and its goal of integrating all other therapeutic auxiliaries in the hospital, when administered by a psychiatrist specially trained in its application, is one answer to the problem of the ever-increasing patient population. Physical medicine and rehabilitation, in addition to its value as supportive treatment for a large number of early psychotics who respond favorably to other accepted psychotherapeutic modalities, provides the best means of therapy for those who do not respond to these measures. Karl Menninger has aptly stated that the neuropsychiatric patient invariably cannot work or play. Therefore, to teach such a patient how to work and how to play is to teach him how to adjust. Physical medicine and rehabilitation must try to make it possible for the patient to find an outlet for his instinctual urges in work and play. The physical medicine and rehabilitation service, as presently constituted at the Northport Hospital, consists of five specialized therapy segments, namely, occupational therapy, manual arts therapy, corrective therapy, physical therapy and educational therapy. This service is staffed by psychiatrically oriented therapists and is guided by a psychiatrist who is physiatrically inclined. Corrective therapy provides physical reconditioning activities for the purpose of offsetting advance of physiological retrogression during the regressive and deteriorative phases of chronic psychosis. It is directed toward the restoration of full strength and stamina through participation in progressively graded physical activities.

Physical therapy in a large neuropsychiatric hospital finds many fruitful applications. Hydrotherapy at the Northport Hospital is psychiatrically and physiatrically oriented to the extent of being medically controlled instead of being a simple nursing procedure. It is used for treatment purposes only, is carefully observed and controlled, and the feeling of punishment is removed and restraining factors lessened by the proper training and guidance of the hydrotherapy aides. Physical therapy procedures have been found successful not only in treatment of the commoner physical disabilities but also in the treatment of functional peripheral vascular disorders resulting from hypostasis. Physical therapy is used at Northport to alleviate or prevent any physical disability. For the institutional psychiatrist who finds himself overwhelmed by the responsibilities of care of a large number of patients, a physical medicine and rehabilitation service provides a laboratory where patients exposed to the modalities of such a program can be carefully observed. It is also believed that a physical medicine and rehabilitation service in a neuropsychiatric hospital will assist in changing the ordinary conception of a psychiatric institution to one in which it is realized that "each individual patient will acquire habits and skills that will contribute to his social and economic integration."

Arthritic Deformities of the Wrist and Fingers. Arthur Steindler.

J. Bone & Joint Surg. **33-A**:849 (Oct.) 1951.

Under the stimulus of the newer and dramatic remedies for rheumatoid arthritis, one may be confident that the general treatment of this disease is no longer neglected. But their effect, whether they be blood transfusion, the gold treatment, or the adreno-pituitary hormones, depends entirely upon the reversibility of the disease. Furthermore, it has not been proved that even the most potent of these hormonal remedies makes the local treatment dispensable in any phase of the arthritis. On the contrary, under the protection of the general treatment, conservative local measures have become more efficient and promising. The methods are well known: physical therapy, application of heat, paraffin baths, splinting, manipulative correction, active exercises, and much the same policy of reeducation as applies to other localized forms of arthritis. All these remedies have their proper place and their proper time, and

it requires good judgment and understanding to allocate them properly and with profit to the patient. The paraffin baths and whirlpool baths are the most effective means in the stage of swelling and pain and before the development of actual contractures. Splinting also occupies an important place. It is indicated in the beginning stages of contracture. In certain cases in which swelling and pain occur spasmodically and in exacerbation, the result of splinting is sometimes striking. If contractures do not yield to traction, is it permissible to apply manipulation? We reject forcible manipulation on general principles, both for the wrist and for the fingers. They cause intra-articular hemorrhages, adhesions, and subsequent shrinkage of the capsule. Even passive stretching should never be carried to the point where tenderness or tear of the capsule develops. Stretching should always be gentle, and one should be sure that the connective tissues are not strained beyond their natural elasticity. It is the author's belief that gentle passive motion and physical therapy accomplish a great deal more than manipulation; an occasional successful case cannot be used as an argument for the latter.

A Method for the Objective Evaluation of Physical and Drug Therapy in the Rehabilitation of the Hemiplegic Patient. Seymour H. Rinzler, Henry Brown, and Joseph G. Benton.

Am. Heart J. **42**:710 (Nov.) 1951.

The use of physical therapy and rehabilitation measures in the treatment of hemiplegia seems well established, but objective measurements of the results have been in qualitative rather than quantitative terms. As Dinken has indicated, such objective measurements should include "determination of muscle strength, range of joint motion and functional testing of the factors inherent in daily living." The value of a new therapeutic approach in the management of hemiplegia can be assessed only by its ability to shorten the time-course of rehabilitation, such effects, if any, being rigidly compared with those obtained in adequate controls. The time-course of rehabilitation may be defined as the shortest interval in days between the onset of treatment and the greatest retained achievement in range of joint motion, muscle strength, and performance of tasks of daily living. This report describes an objective technique, established to study the effect of physical therapy and rehabilitation techniques on the time-course of rehabilitation in the subject with hemiplegia as the result of a cerebrovascular accident. In addition, it can be used to screen the effects of drugs on this clinical entity. There is great need for such a method at the present time. Patients selected for study are placed on the regular program of physical therapy and rehabilitation advocated by Rusk and his group, which includes active and passive motion of the affected extremities, ambulation, speech training for the aphasic individual, and the teaching of the activities of daily living, such as personal care, feeding, hand activities, and walking activities. The rehabilitation program for each patient is prescribed by Rehabilitation Service physicians according to individual requirements. Serial determinations are made of all three modalities by experienced physical therapists at regular intervals during the course of therapy and observation, and the results are documented. In addition, observations by the physician of the effects of drugs on blood pressure, pulse rate, electrocardiogram, side reactions, and changes, if any, on hemogram and urine are made. Data derived by this method are quantitative and lend themselves readily to statistical analysis.

Autonomic Studies in the Diagnosis of Peripheral Nerve Lesions. Francis P. Nash.

Missouri M. A. **49**:116 (Feb.) 1952.

Peripheral nerve injuries are frequent complications of battle wounds of the extremities. Such injuries often are associated with bony fractures and extensive soft tissue damage. These associated injuries diminish the reliability of motor and sensory studies in the detection of any existent nerve lesions. This report lends emphasis to the value of the study of peripheral sweat patterns and skin temperature in the diagnosis of peripheral nerve lesions. Such studies are of special value in cases in which associated injury alters the reliability of motor and sensory studies.

Frostbite. Agnes Spock-Ward.

Am. J. Nursing **52**:68 (Jan.) 1952.

In cases of frostbite, along with the usual medical procedures, the patient does therapeutic exercises daily to prevent stiffness of affected parts, to prevent contractures, to increase blood circulation and flexibility, to maintain muscle tone, and to improve his morale. The exercises are active and active assistive. They commence at the same time as the patient's other treatments or as soon after he is admitted to the hospital as a therapist can see him. The chief medical officer of the cold injury section at the Osaka Army Hospital in Japan made this a "blank order," which could be altered only when exercises were contraindicated for reasons other than frostbite. When the hands are frostbitten, exercise with a rubber sponge may be used to prevent contraction, and to increase the strength of the hand. If the physical therapist is unable to visit each patient daily, it is the nurse's responsibility to see that each one performs the prescribed exercises.

ARCHIVES *of* PHYSICAL MEDICINE

OFFICIAL JOURNAL AMERICAN CONGRESS OF PHYSICAL MEDICINE

VOLUME XXXIII — January-December, 1952, Inclusive

OFFICERS OF THE AMERICAN CONGRESS OF PHYSICAL MEDICINE

EXECUTIVE AND EDITORIAL OFFICES
30 NORTH MICHIGAN AVENUE, CHICAGO 2

BOARD OF GOVERNORS

President — Walter M. Solomon.....Cleveland, Ohio
President-Elect — William B. Snow.....New York, N. Y.
First Vice-President — William D. Paul.....Iowa City, Iowa
Second Vice-President — Howard A. Rusk.....New York, N. Y.
Third Vice-President — Gordon M. Martin.....Rochester, Minn.
Fourth Vice-President — A. B. C. Knudson.....Washington, D. C.
Fifth Vice-President — Donald L. Rose.....Kansas City, Kan.
Secretary — Frances Baker.....San Mateo, Calif.
Treasurer — Frank H. Krusen.....Rochester, Minn.
Executive Director — Walter J. Zeiter.....Cleveland, Ohio
Executive Secretary — Dorothea C. Augustin.....Chicago, Ill.

EXECUTIVE COUNCIL

Robert L. Bennett, M.D., Warm Springs, Ga., Chairman.
Norman E. Titus, M.D., West Chester Pa., Secretary.
William Bierman, M.D., New York, N. Y.
Earl C. Elkins, M.D., Rochester, Minn.
Kristian G. Hansson, M.D., New York, N. Y.
John Severy Hibben, M.D., Pasadena.
Abraham R. Hollender, M.D., Miami Beach, Fla.
O. L. Huddleston, M.D., Santa Monica, Calif.
H. Worley Kendell, M.D., Peoria, Ill.
Miland E. Knapp, M.D., Minneapolis.
Disraeli Kobak, M.D., Chicago.
Frank H. Krusen, M.D., Rochester, Minn.
Walter S. McClellan, M.D., Saratoga Springs, N. Y.
Fred B. Moor, M.D., Los Angeles.
Nathan H. Polmer, M.D., New Orleans.
William H. Schmidt, M.D., Philadelphia.
Arthur L. Watkins, M.D., Boston, Mass.
Walter M. Solomon, M.D., Cleveland, Ex-Officio.

EDITOR EMERITUS

Disraeli Kobak ..... Chicago, Ill.

SUBJECT INDEX

This is an index of all the reading matter in the ARCHIVES, except the Medical News Department.

The letters used to explain in which department the matter indexed appears are as follows: "E," Editorial; "ab," abstracts; the asterisk (*) indicates an original article in the ARCHIVES.

This is a subject index and one should, therefore, look for the subject word, with the following exceptions: "Book Reviews" and "Deaths," are indexed under these titles at the end of the letters "B" and "D." The name of the author, in brackets, follows the subject entry. If there are more than two authors, only the name of the first author is given.

For author index, see page 757.

C

DEATHS

E

F

G

H

AUTHOR INDEX

In this Index are the names of the authors which have appeared in the *Archives*. The asterisk (*) preceding the page reference indicates that the article appeared in full in the *Archives*, "d" refers to discussion, "E" refers to editorial and "ab" indicates abstract. For subject index, see page 750.

INDEX TO PAGES

Of the Archives, According to Monthly Issues—Volume XXXIII, January-December, 1952

1— 64	1	January	385—448	7	July
65—128	2	February	449—512	8	August
129—192	3	March	513—576	9	September
193—256	4	April	577—640	10	October
257—320	5	May	641—704	11	November
321—384	6	June	705—768	12	December

PHYSICAL MEDICINE AND REHABILITATION **

The following services are approved by the Council on Medical Education and Hospitals, and the American Board of Physical Medicine and Rehabilitation. Residencies in this specialty have been approved without specifying the number of years for which they are accredited. The Board will give appropriate credit for training in these hospitals on an individual basis.

Hospitals, 45; Assistant Residencies and Residencies, 85.

Name of Hospital	Location	Chief of Service	Inpatients Treated	Number of Treatments	First Year Residencies Offered[2]	Total Residencies Offered[2]	Beginning Stipend (Month)
UNITED STATES ARMY							
Letterman Army Hospital★	San Francisco	R. C. Psaki	4,231	116,264	—	—	.....
Fitzsimons Army Hospital★	Denver	H. B. Luscombe	7,045	230,440	—	—	.....
Army Medical Center★	Washington, D. C.	J. H. Kuitert	5,224	344,228	1	4	.....
VETERANS ADMINISTRATION							
Veterans Admin. Hospital★[1,2]	Long Beach, Calif.	Roy H. Nyquist	3,305	182,286	1	1	.....
Veterans Admin. Hospital[1,2]	Denver	C. C. Hoffman	731	11,804	1	1	.....
Veterans Admin. Hospital[1]	Hines, Ill.	L. B. Newman	5,135	463,131	4	4	.....
Veterans Admin. Hospital[1,2]	Wadsworth, Kan.	L. Blau	2,471	174,247	1	2	.....
Veterans Admin. Hospital[1,2]	Framingham, Mass.	F. Friedland	7,100	214,000	1	3	.....
Veterans Admin. Hospital[1,2]	New York City	A. S. Abramson	4,196	302,119	1	3	.....
Veterans Admin. Hospital[1,2]	Cleveland	H. T. Zankel	1,646	78,194	1	1	.....
Veterans Admin. Hospital[1,2]	Portland, Ore.	E. W. Fowlks	4,369	112,456	1	2	.....
Veterans Admin. Hospital[1]	Aspinwall, Pa.	S. Machover	1,957	56,412	1	1	.....
Veterans Admin. Hospital[2]	Memphis, Tenn.	F. I. Mahoney	10,090	152,031	—	—	.....
Veterans Admin. Hospital★[1,2]	Houston, Texas	B. L. Boynton	1,682	60,589	1	2	.....
Veterans Admin. Hospital★[1,2]	Milwaukee	R. Piaskoski	16,084	209,092	—	—	.....
NONFEDERAL							
Los Angeles County Hospital★[1,2]	Los Angeles	E. Austin	.....	93,906	—	1	173
White Memorial Hospital★[1,2]	Los Angeles	F. B. Moor	39,608	39,608	1	1	182
University of Colorado Medical Center Colorado General Hospital★[1,2]	Denver	H. Dinken	2,177	38,381	1	2	180
State of Connecticut Veterans Home and Hospital[1,2]	Rocky Hill, Conn.	N. K. Covalt	663	63,375	—	3	253.34
George Washington University Hospital[1,2]	Washington, D. C.	C. S. Wise	2,433	15,563	—	—	130
Emory University Hospital★[1,3]	Emory Univ., Ga.	R. L. Bennett	1,001	15,846	—	1	250
Georgia Warm Springs Foundation[1,2]	Warm Springs, Ga.	R. L. Bennett	998	114,110	1	4	250
Michael Reese Hospital★[1,2]	Chicago	C. Molander	3,589	30,929	1	1	25
Northwestern University Medical Center[1,2]	Chicago	.....	13,752	43,409	—	—	80
Research and Educational Hospitals★[1,2]	Chicago	F. A. Hellebrandt	12,266	12,266	1	3	60
University of Kansas Medical Center★[1,2]	Kansas City, Kan.	D. Rose	2,563	49,649	—	1	125
Massachusetts General Hospital★[1,2]	Boston	A. L. Watkins	3,039	33,483	—	2	66.67
University Hospitals★	Ann Arbor, Mich.	J. W. Rae, Jr.	.....	50,659	2	6	134.16
University of Minnesota Hospitals★[1,2]	Minneapolis	F. J. Kottke	14,007	25,194	2	6	142.50
Mayo Foundation[1,2]	Rochester, Minn.	F. H. Krusen	.....	.....	2	6	150
Barnes Hospital★[2]	St. Louis	S. Mead	9,572	9,572	—	1	25
Bellevue Hospital Center—Division III—New York University College of Medicine★[1,2]	New York City	H. A. Rusk	1,082	83,147	4	7	80
Goldwater Memorial Hospital★[1,2]	New York City	M. Dacso	674	44,446	1	2	90
Hospital for Joint Diseases★[1,3]	New York City	J. Weiss	.....	90,407	1	2	60
Hospital for Special Surgery[2]	New York City	K. G. Hansson	19,388	37,284	1	1	160
Metropolitan Hospital[1,2]	New York City	J. Tobis	1,023	24,788	—	—	.....
Mount Sinai Hospital★[1,2]	New York City	W. Bierman	8,464	32,947	1	1	50
New York City Hospital★[1,2]	New York City	F. K. Safford, Jr.	1,030	37,080	1	1	160
Presbyterian Hospital★[1,2]	New York City	R. C. Darling	5,011	175,061	1	1	208.33
St. Luke's Hospital★[1,2]	New York City	R. Muller	1,099	115,572	1	1	60
Rehabilitation Hospital[1,2]	West Haverstraw, N. Y.	M. Hoberman	517	332,205	1	1	225
Cleveland Clinic Hospital[1,2]	Cleveland	W. J. Zeiter	16,638	36,957	1	3	150
University Hospitals Ohio State University Hospital[1,2]	Columbus, Ohio	R. E. Worden	1,245	15,894	—	—	125
Hospital of the Univ. of Pennsylvania★[1,2]	Philadelphia	G. Piersol	2,771	45,549	—	1	.....
Philadelphia General Hospital★[1,2]	Philadelphia	A. Martucci	1,225	66,802	2	2	112

The Star (★) indicates hospital approved for intern training.
1 Residencies open to women.
2 Available to graduates of foreign medical schools.
3 Includes fellowships.

** Reprinted in part J. A. M. A. 150:339 (Sept. 27) 1952.

APPROVED SCHOOLS OF PHYSICAL THERAPY **

Council on Medical Education and Hospitals of the American Medical Association

Name and Location of School	Medical Director and Technical Director	Entrance Requirements [1]	Duration of Course	Classes Begin	Maximum Enrolment	Tuition	Certificate, Diploma, Degree
Medical Department — U. S. Army							
(Address all inquiries to the Office of the Surgeon General, Department of the Army, Washington 25, D. C.)							
Medical Field Service School, Brooke Army Medical Center, San Antonio, Texas	Charles D. Shields, Lt. Col., M.C. Agnes P. Snyder, Major, WMSC	e	49 wks.	Mar.-Sept.	26	None	Certificate
Fitzsimons Army Hospital, Denver	H. B. Luscombe, Col., M.C.	Affiliated with Medical Field Service School					
	Mary S. Lawrence, Capt., WMSC						
Letterman Army Hospital, San Francisco, California	Raoul C. Psaki, Lt. Col., M.C.	Affiliated with Medical Field Service School					
	Emma Harr, Maj., WMSC						
Walter Reed Army Hospital, Washington, D. C.	J. H. Kuttert, Lt. Col., M.C.	Affiliated with Medical Field Service School					
	Brunetta Kuehlthau, Maj., WMSC						
Nonfederal							
Childrens Hospital, Los Angeles*	S. S. Matthews, M.D.	a-b-d	14 mos.	Sept	14	$300	Cert. or Degree
	Mrs. Mary J. Dodge						
College of Medical Evangelists, Los Angeles*	F. B. Moor, M.D.	a-b-c	15 mos.	Sept	16	$300	Cert. or Degree
	R. Wm. Berdan						
University of Southern California, Los Angeles*	C. L. Lowman, M.D.	a-b-d	14 mos.	Sept	16	Univer.	Certificate
	Charlotte W. Anderson	f	4 yrs.	FebSept	6	Univer.	Cert. & Degree
University of California School of Medicine, San Francisco*	Lucile Eising, M.D.	d	12 mos.	Sept	16	$220[3]	Cert. or Degree
	Margery L. Wagner						
Stanford University, Stanford University, Calif.*	W. H. Northway, M.D.	a-d-e	12 mos.	Varies	29	$690	Certificate
	Lucille Daniels	f	4 yrs.	Sept	16	$220 qr.	Degree
University of Colorado Medical Center, Denver*	Harold Dinken, M.D.	a-b-d	12 mos.	Sept	12	$208[2]	Cert. or Degree
	Dorothy Hoag						
Northwestern University Medical School, Chicago	E. D. W. Hauser, M.D.	a-b-d	12 mos.	Oct	16	$450	Certificate
	Elizabeth C. Wood						
State University of Iowa College of Medicine, Iowa City*	W. D. Paul, M.D.	e	12 mos.	Sept	20	$200	Certificate
	Olive C. Farr						
University of Kansas Medical Center, Kansas City, Kan.*	D. L. Rose, M.D.	d	12 mos.	FebSept	3	$40[3]	Certificate
	Ruth G. Monteith	f	4 yrs.	FebSept	9	$40[3]	Degree
Simmons College, Boston	W. T. Green, M.D.	a-e	16 mos.	Sept	24	College	Diploma
	Shirley M. Cogland	f	4½ yrs.	Sept			Degree
Boston University College of Physical Education for Women, Sargent College, Cambridge, Mass.	Kenneth Christophe, M.D.	c-d-e-f	1-2-4 yrs.	Sept	30	Univer.	Cert. or Degree
	Adelaide L. McGarrett						
Bouve-Boston School in affiliation with Tufts College, Medford, Mass.	Howard Moore, M.D.	f	4 yrs.	Sept	16	$550	Dipl. & Degree
	Constance K. Greene						
University of Minnesota, Minneapolis*	F. J. Kottke, M.D.	c	2 yrs.	Sept	30	$126	Degree
	Ruby Green Overmann						
Mayo Clinic, Rochester, Minn.*	E. C. Elkins, M.D.	a-b-c	2 yrs.	Sept	38	$250	Certificate
	Harry Keown						
St. Louis University, Division of Health and Hospital Services, St. Louis[4]	A. J. Kotkis, M.D.	f	4 yrs.	JanSept	12	$175 Semes.	Degree
Washington University School of Medicine, St. Louis*	Sister Mary Imelda	c	2 yrs.	Sept	16	$450 1st yr.[3]	Degree
	Sedgwick Mead, M.D.					$325 2d yr.[3]	
	Beatrice F. Schulz						
Albany Hospital, Albany, N. Y.	J. W. Ghormley, M.D.	a-b-d	12 mos.	Sept	6	$300	Certificate
	Catharine Graham	f	4 yrs.	Sept		$500	Degree
Columbia University College of Physicians and Surgeons, New York City*	W. B. Snow, M.D.	a-c-e	1-2 yrs.	Sept	50	$680 (1 yr.) $1,200 (2 yrs.)	Cert. or Degree
	Mary E. Callahan						
New York University School of Education, New York City*	G. G. Deaver, M.D.	a (+1 yr. coll.) b-d	12 mos.	Sept	40	$760	Cert. & Degree
	Elizabeth C. Addoms						
Duke University, Durham, N. C.*	L. D. Baker, M.D.	a-b-d	15 mos.	Oct	12	$350	Certificate
	Helen Kaiser						
Cleveland Clinic Hospital, Cleveland*	Walter J. Zeiter, M.D.	a-b-c	12 mos.	Oct	12	$200	Diploma
	Dorothy Spark						
D. T. Watson School of Physical Therapy, Leetsdale, Pa.*	Jessie Wright, M.D.	a-b-d	12 mos.	Oct	25	$300	Diploma
	Kathryn Kelley						
Division of Physical Therapy of the School of Auxiliary Medical Services of the University of Pennsylvania, Philadelphia*	G. M. Piersol, M.D.	e	12 mos.	FebSept	32	$600	Certificate
	Dorothy E. Baethke	f	4 yrs.	Sept	40	$600	Cert. & Degree
University of Texas School of Medicine, Galveston*	G. W. N. Eggers, M.D.	a-b-d	12 mos.	Jan	8	$149[3]	Cert. or Degree
	Ruby Decker						
Hermann Hospital, Houston, Texas*	O. O. Selke, Jr., M.D.	a-b-d	12 mos.	Oct	15	$300	Certificate
	Elizabeth Barkley						
Baruch Center of Physical Medicine and Rehabilitation, Medical College of Virginia, Richmond*	Herbert Park, M.D.	a-b-d	12 mos.	Sept	52	$200[3]	Diploma
	Susanne Hirt	f	4 yrs.	Sept			Degree
University of Wisconsin Medical School, Madison*	H. D. Bouman, M.D.	a-b-d	12 mos.	Sept	32	$40	Certificate
	Margaret A. Kohli	f	4 yrs.	FebSept	50	Semes.[3]	Cert. & Degree

** Reprinted in part J. A. M. A. 146:197 (May 12) 1951.

1. Courses are so arranged that any of the entrance requirements will qualify students for training. a — Graduation from accredited school of nursing; b — Graduation from accredited school of physical education; c — Two years of college with science course; d — Three years of college with science course; e — Four years of college with science course; f — 16th school graduation.
2. Nonresidents charged additional fee.
3. Male as well as female students admitted.
4. Effective July 1, 1952, tuition will be $262.50 for each of the first three semesters, and $112.50 for the fourth semester, making a total of $900.00 for two years.

APPROVED SCHOOLS OF OCCUPATIONAL THERAPY **

Council on Medical Education and Hospitals of the American Medical Association

Name and Location of School	Director and Medical Director	Entrance Requirements	Duration of Course[1]	Classes Begin	Graduates in 1950	Tuition per Year	Certificate, Diploma, Degree
University of Southern California, Los Angeles*	Margaret S. Rood	Degree	18 mos.	Varies	12	$594	Certificate
	J. B. Armstrong, M.D.	High sch.	5 yrs.	Varies	19	$540	Cert. & Deg.
Mills College, Oakland, Calif.	Elsa H. Hill	Degree	2½ yrs.	FebSept	2	$250	Certificate
	S. M. Dorinson, M.D.	High sch.	5 yrs.	FebSept	4	$650	Cert. & Deg.
San Jose State College, San Jose, Calif.*	Mary D. Booth	Degree	18 mos.	Varies	1	$ 38.50	Certificate
	Charles Ianne, M.D.	High sch.	45 mos.	Varies	13	$ 38.50	Cert. & Deg.
University of Illinois College of Medicine, Chicago*	Beatrice D. Wade	High sch.	5 yrs.	MarSept	13	$110	Degree
	S. W. Olson, M.D.						
State University of Iowa, Iowa City*	Marguerite McDonald		18 mos.	FebSept	2	$144[2]	Certificate
	W. D. Paul, M.D.	High sch.	46 mos.	FebSept	5	$144[2]	Cert. & Deg.
University of Kansas, Lawrence	Nancie B. Greenman	High sch.	45 mos.	FebSept	16	$136[2]	Degree
	D. L. Rose, M.D.						
Boston School of Occupational Therapy, 7 Harcourt St., Boston*	Marjorie B. Greene	Degree	2 yrs.	Sept	13	$500	Diploma
Wayne University, Detroit*	A. W. Reggio, M.D.	High sch.	5 yrs.	Sept	21	$500	Degree
	Barbara Jewett	Degree	19 mos.	Varies	1	$150	Certificate
	F. A. Weiser, M.D.	High sch.	46 mos.	Varies	3	$150	Degree
Kalamazoo School of Occupational Therapy, Kalamazoo, Mich.*	Marion R. Spear	Degree	18 mos.	FebSept	3	$ 75[3]	Diploma
	R. B. Burrell, M.D.	1 yr. coll.	4 yrs.	FebSept	22	$ 75[3]	Dipl. & Deg.
Michigan State Normal College, Ypsilanti, Mich.*	Frances Herrick	High sch.	5 yrs.	FebSept	6	$ 97.50[3]	Cert. & Deg.
	V. L. VanDuzen, M.D.						
University of Minnesota, Minneapolis*	Borghild Hansen	High sch.	40 mos.	Sept	12	$126[2]	Degree
	F. J. Kottke, M.D.						
College of St. Catherine, 2004 Randolph, St. Paul	Sister Jeanne Marie	High sch.	4½ yrs.	Varies	24	$225	Degree
	J. M. Ryan, M.D.						
Washington University School of Medicine, St. Louis*	Erna L. Rozmarynowski	Degree	11-14 mos.	Sept		{ Univer-	Certificate
	R. A. Moore, M.D.	2 yrs. coll.	28 mos.	Sept	14	{ sity	Degree
University of New Hampshire, Durham*	Esther Drew	High sch.	5 yrs.	Sept	8	$200[2]	Cert. & Deg.
	L. A. MacDonald						
Columbia University College of Physicians and Surgeons, New York City*	Marjorie Fish	Degree	17 mos.	Sept	20	$600	Certificate
New York University School of Education, New York City*	W. B. Snow, M.D.	2 yrs. coll.	27 mos.	Sept	10	$600	Degree
	Frieda J. Behlen	1 yr. coll.		FebSept	3	$500	Certificate
Ohio State University, Columbus*	John Sawhill, M.D.	High sch.	4½ yrs.	FebSept	26	$500	Cert. & Deg.
	Martha E. Jackson	High sch.	4 yrs.	Varies	15	$ 90[2]	Degree
	R. H. Jacques, M.D.						
Philadelphia School of Occupational Therapy of the School of Auxiliary Medical Services of the University of Pennsylvania, Philadelphia*	Helen S. Willard	Degree	18 mos.	Sept	21	$600	Certificate
	J. C. Yaskin, M.D.	High sch.	5 yrs.	Sept	1	$600	Degree
Texas State College for Women, Denton	Fanny B. Vanderkooi	Degree	18 mos.	FebSept			Certificate
	O. T. Woods, M.D.	High sch.	5 yrs.	FebSept	5	$ 50	Degree
Richmond Professional Institute, 901 W. Franklin St., Richmond, Va.*	H. Elizabeth Messick	High sch.	4 yrs.	Sept	5	$200	Degree
	T. E. Barrett, M.D.	Degree	10-18 mos.	FebSept	4	$182+	Certificate
College of Puget Sound, 18th and Warner Sts., Tacoma, Wash.*	Edna-Ellen Bell		2 yrs.	FebSept		$400	Certificate
	A. J. Hermann, M.D.	High sch.	5 yrs.	FebSept	5	$350	Cert. & Deg.
University of Wisconsin, Madison*	Caroline G. Thompson	High sch.	5 yrs.	Sept	12	$120[2]	Cert. & Deg.
	H. D. Bouman, M.D.						
Milwaukee-Downer College, Dept. of Occupational Therapy, 2512 E. Hartford Ave., Milwaukee	Henrietta W. McNary	2 yrs. coll.	3 yrs.	Sept	2	$350	Diploma
	M. C. Borman, M.D.	High sch.	5 yrs.	Sept	20	$350	Dipl. & Deg.
Mount Mary College, 92d and Burleigh, Milwaukee	Sister Mary Arthur	High sch.	5 yrs.	Sept	14	$260	Cert. & Deg.
	J. C. Griffith, M.D.						

** Reprinted J. A. M. A. 146:198 (May 12) 1951.

1. Duration of course is expressed in academic years or in number of months.

2. Nonresidents charged additional fee.

* Male as well as female students admitted.

American Society of Physical Medicine and Rehabilitation

Officers and Committees for 1953

President — Walter S. McClellan
President-Elect — Donald L. Rose
Vice-President — Harold Dinken
Secretary-Treasurer — Max K. Newman

Board of Governors

Miland E. Knapp
Frances Baker
Walter S. McClellan
Max K. Newman
Ben L. Boynton
Nila Kirkpatrick Covalt
William D. Paul

Membership Committee

Herman L. Rudolph, Chairman
Solomon Winokur
Fritz Friedland

Nominating Committee

George D. Wilson, Chairman
Louis B. Newman
Ray Piaskoski

Program Committee

Donald A. Covalt, Chairman
Murray B. Ferderber
Robert L. Bennett

MEETINGS OF INTEREST TO THOSE IN THE FIELD OF PHYSICAL MEDICINE AND REHABILITATION

In this column will be published information about meetings of interest to those in the field of physical medicine. New data should be sent promptly to the office of the ARCHIVES, 30 North Michigan Avenue, Chicago 2, Illinois.

Chicago Society of Physical Medicine and Rehabilitation — regular monthly meetings, September through May, every fourth Wednesday. Milton G. Schmitt, Secretary, 6970 N. Clark St., Chicago 26.

New York Society of Physical Medicine — Monthly meetings held First Wednesday. Madge C. L. McGuinness, M.D., Secretary, 48 E. 62nd St., New York 21, N. Y.

Pennsylvania Academy of Physical Medicine and Rehabilitation — Regular meetings on third Thursday of month, held bi-monthly. Secretary, Charles A. Furey, M.D., 2201 St. James St., Philadelphia 3, Pa.

International

World Congress of the World Confederation for Physical Therapy — London, England, September 7-12, 1953. Secretary, Miss M. J. Neilson, Chartered Society of Physiotherapy, Tavistock House, South, Tavistock Square, London, W.C. 1, England.

DUO-PULSATOR by fischer

Presents the well-known valuable FARADIC and SINUSOIDAL CURRENTS in a Pulse Form

•

Stimulation without Irritation

R. A. FISCHER & CO.

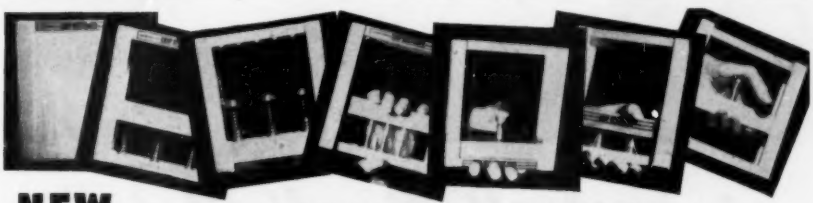
write ➧

517 COMMERCIAL STREET, GLENDALE 3, CALIF.

fischer

➧ for descriptive literature

Manufacturer of **ELECTRO-THERAPY EQUIPMENT**



NEW THE UNDERWOOD GRIP RESTORER

A NEW APPROACH TO AN OLD PROBLEM

- **RESISTANCE RANGE** . zero to twelve pounds.
- **VERSATILITY** . . . . fingers exercised individually or in combination.
- **EFFICIENCY** . . . . . instantly adjustable for any function—always ready for use.
- **APPEARANCE** . . . . the metal resistance units are enclosed in handsome hardwood cabinet with sliding panels.
- **ADAPTABILITY** . . . usable for children or adults without adjustment.

Send for free illustrated folders on other Manuflex products including the Underwood MANUFLEX approved by the Council on Physical Medicine and Rehabilitation (plastic model $37.50).

All Manuflex products sold by the J. A. Preston Corporation, 175 Fifth Avenue, New York, N. Y.

MANUFLEX CO.

2130 N. E. KLICKITAT, PORTLAND, OREGON

SEND NO MONEY—TRIAL OFFER

To practicing therapists and members of the medical profession.

MANUFLEX COMPANY, 2130 N. E. Klickitat, Portland 12, Oregon.

Please send me an UNDERWOOD GRIP RESTORER to use freely for 3 days. At the end of that time I will either return the device or remit $24.75 in full payment. It is understood that I am under no obligation to buy.

NAME_____

TITLE_____

ADDRESS_____

Bookkeepers...
Bakers...
and Busy
Dressmakers...

Americans Are Rolling Up Their Sleeves!

YES, ALL KINDS OF PEOPLE ARE GIVING BLOOD SO THAT OUR WOUNDED MAY LIVE!

● Today, the blood of a Boston bookkeeper may be flowing through the veins of a wounded kid from a Kansas farm... the blood of a pretty Southern housewife may have saved the life of a grizzled leatherneck. For, blood is blood, a God-given miracle for which there is no substitute... and when a man's life hangs in the balance and blood is needed, there is nothing else to take its place!

Right now the need for blood is urgent. In hospitals—at home and overseas—many men require four and six transfusions during delicate operations. And the blood *must be there*—when it's needed. So give the most precious gift of all—*your* blood!

Be assured that giving blood is neither difficult nor distressing. And what a thrill there is in knowing that you've performed a really unselfish act! So call your local American Red Cross today and make an appointment. And tell your friends and neighbors about your experience. Let them share the wonderful feeling Americans get when they roll up their sleeves—and give blood.

But—

WHAT HAPPENED TO THAT PINT OF BLOOD YOU WERE GOING TO GIVE?

Call Your American Red Cross Today!

PROVED

EFFICIENT, EFFECTIVE HEATING

The tissue heating effectiveness of the carborundum-type infra-red element has been demonstrated in a study in which the following temperature changes were recorded:*

Temperature Rise, Degrees C., After One Minute of Heating

ENERGY**, GM. Cal/Cm²/Min	SKIN	SUBCUT.	MUSCLE (4mm. depth)	MUSCLE (10mm. depth)	MUSCLE (15mm. depth)
2.18	7.35	4.40	3.10	0.80	0.25

**Radiant flux density at skin surface.

For a rich source of infra-red, use a Burdick Zoalite Infra-Red Lamp, with the famous Burdick Carborundum Element.

*Arch. Physical Medicine, 30:691-699 (Nov.) 1949.

Burdick ZOALITE®

Infra-Red Lamps

Burdick Zoalite Infra-Red Lamps are available in sizes suitable for office, hospital and home (Prescription Model).

THE BURDICK CORPORATION, Milton, Wisconsin

Please send me information on Burdick Zoalite Infra-Red Lamps.

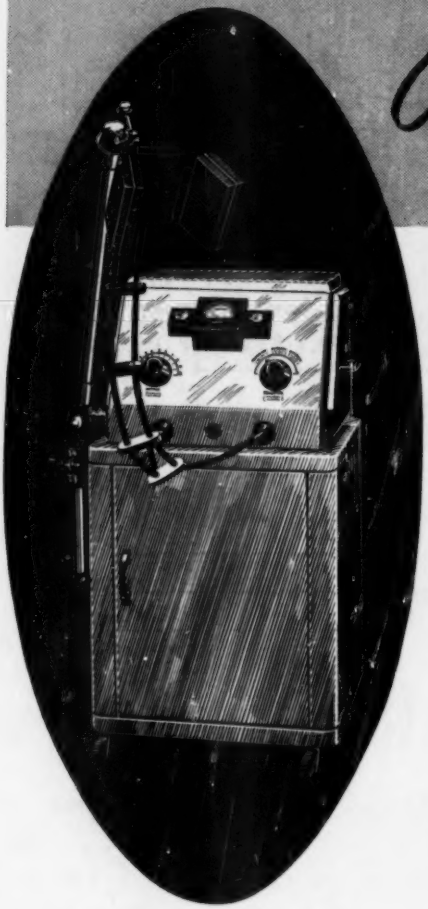
Doctor_____

Address_____

City_____ Zone_____ State_____

The BIRTCHER *Challenger*

SHORT WAVE DIATHERM



PROVIDES ALL METHODS OF APPLICATION

F.C.C. APPROVED

WHATEVER the method of application, unexcelled diathermy treatment may be given with the Challenger. The Challenger provides more diathermy energy than is required in any application and the diathermy provided is dependable and safe to all parts of the body — even around the eyes and other critical areas.

The Challenger is simple to operate. Preliminary adjustment is reduced to a minimum by one-knob control. The nurse or technician can quickly master the operation of the Challenger.

The Challenger is a rugged unit that gives life-long, trouble-free service and is unconditionally guaranteed, including tubes, for a period of two years. Relatively inexpensive in price, the Challenger is a handsome unit that adds to the appearance as well as the efficiency of any office or clinic.

Be *sure* to see a Challenger *before* you buy any short wave diatherm for office or clinic.

FEDERAL COMMUNICATIONS COMMISSION
APPROVAL NO. D529

THE BIRTCHER CORPORATION

4371 Valley Blvd.
Los Angeles 32, Calif.

Write for free literature

NAME_____

ADDRESS_____

CITY_____ STATE_____